Jl S. Afr. Bot. 48 (3): 329–407 (1982)

STUDIES IN THE GENERA OF THE *DIOSMEAE* (RUTACEAE): 14. A REVIEW OF THE GENUS *DIOSMA* L.

Ion Williams
(Honorary Reader, Bolus Herbarium, University of Cape Town
Honorary Research Worker, Compton Herbarium, Kirstenbosch
29–10th Street, Voëlklip 7203, R.S.A.)

Abstract

Twenty-eight species belonging to the genus *Diosma* L. are listed with diagnoses and keys. Species not recently published are described in detail from fresh material with current distribution maps and lists of specimens examined. Two new species, *D. parvula* and *D. tenella* are described and a new name, *D. fallax*, has been substituted for *D. eckloniana*.

Uittreksel

STUDIES IN DIE GENERA VAN DIE *DIOSMEAE* (RUTACEAE): 14. 'N OORSIG VAN DIE GENUS *DIOSMA* L.

Die ag-en-twintig soorte van die geslag *Diosma* L., met diagnose en sleutels, word gekatalogiseer. Soorte nie onlangs gepubliseer nie word van vars materiaal beskryf. Twee nuwe *Diosma* soorte, *D. parvula* en *D. tenella* word beskryf en die naam *D.eckloniana* word vervang deur *D. fallax*.

Historical Background

The name *Diosma*, proposed by Linnaeus in the first edition of his *Genera Plantarum* published in Leiden in 1737, is derived from "dio" meaning *of the sky* and "-osma" meaning *scent* or, in other words, *the heavenly scent*. At that time Linnaeus observed that the fruit in scent and shape resembled that of *Anisum stellatum*. With the publication of Linnaeus's *Species Plantarum* in 1753 the nomenclatural validity of the generic name *Diosma* was confirmed. The discovery in Southern Africa of many new species meant that by the end of the next seventy years about a dozen new genera in the Rutaceae *(Diosmeae)* had been proposed. Of these, two, *Barreira* and *Hartogia* proposed by Linnaeus had been transferred to *Diosma* by Linnaeus himself in 1771 and then in 1824, when De Candolle published the first part of his *Prodromus*, he transferred nearly all the remaining new genera to *Diosma*. In the same year Bartling & Wendland in revising the *Diosmeae* maintained some of these genera and proposed several new generic names

---

Accepted for publication 6th January, 1982.

These proposals were not however universally acclaimed and in 1839 D. N. F. Dietrich in his *Synopsis Plantarum* transferred all these genera back into *Diosma* making many new combinations in the process. In this he was echoed by Steudel (1841) in his *Nomenclator Botanicus.*

In a revision of the Rutaceae for the *Flora Capensis* (1860), Sonder saw fit to completely disregard De Candolle, Dietrich and Steudel and to uphold the work done by Bartling & Wendland. Their more restricted concept of the genus *Diosma* has been followed by the present author and the very long list appended to this review, containing 164 excluded species, bears witness to the controversy which existed more than 120 years ago.

DISTRIBUTION

The twenty-eight species comprising the genus *Diosma* are found in the south and south western Cape Province in an area extending from the Cockscomb mountain and from near Humansdorp in the east to the Cape Peninsula in the west and from Cape Agulhas in the south to near Nieuwoudtville in the north, with outliers in Little Namaqualand near Garies and in the vicinity of Springbok. As far as is known these outlying populations, consisting of only two species, *D. acmaeophylla* and *D. ramosissima*, are unique in

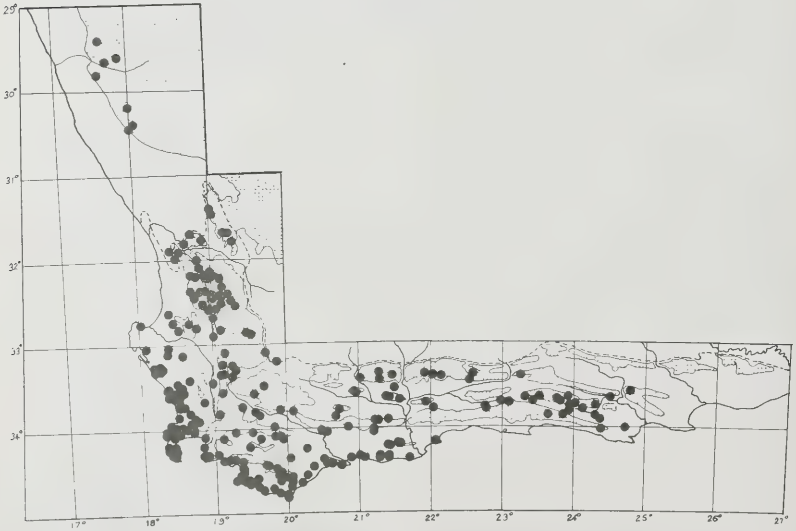

FIG. 1.
Distribution of the genus *Diosma*.

that with the exception of the species *Agathosma namaquensis* Pillans all other species in the various genera of the *Diosmeae* are unrepresented to the north of Nieuwoudtville.

Within the main area of distribution, populations appear to be particularly concentrated fairly near to the coast from the Gouritz River Mouth around the Cape to Mamre.

Another area showing a smaller concentration of species is to be found in the Clanwilliam Division and a somewhat outlying group of species is to be found in the Langkloof and Baviaanskloof areas in the extreme east.

The distribution map, Figure 1, shows the actual collection localities of all specimens observed in all species in the genus with the exception of *Diosma hirsuta* where only one collection has been shown in each quarter degree square in which the species is known to occur.

MATERIAL CITED

All specimens cited in this paper, including types, have been examined by the author.

GENERIC DESCRIPTION

Diosma L. Sp. Pl. **1**: 198 (1753); Gen. Pl.: 60 (1737); Roy., Flor. Leyd. Prodr.: 435 (1740); Berg., Plant. Cap.: 62 (1767); Juss., Gen. Plant.: 298 (1789); Engl., Gen. Plant. **6017**: 1157 (1840); Sond. in Flor. Cap. **1**: 373 (1860); Dyer, Gen. S.Afr. Flow. Plant. **1**: 291 (1975). Type species: *D. hirsuta L.*

Shrubs woody, from less than 0,2 m tall, low and spreading to 3 m tall, erect, normally arising from a single stem at base. *Branches* glabrous or glabrescent, devoid of leaves, usually erect. *Branchlets* erect, slender, short, glabrous or minutely puberulous, leafy, sometimes clustered. *Leaves* 1,5–26 mm long, 0,7–4 mm broad, simple, alternate or less usually opposite, linear, linear-lanceolate, lanceolate, subulate, ovate, elliptic or oblong, acute with a sharp point or mucronate or obtuse, sessile or short-petiolate, eciliate or ciliolate or crisped-ciliate, gland-dotted, glabrous or pubescent. *Inflorescence* terminal; *flowers* up to 10 mm diam., usually much less, short-pedicellate or sessile, solitary or up to 4-nate or crowded up to 12 together, borne on short branchlets or in much reduced compound racemes. *Bract* one per flower, often resembling a reduced leaf. *Bracteoles* two, usually very much reduced. *Calyx lobes* five, small, persisting, deltoid or broadly lanceolate or ovate, acute or obtuse, usually minutely ciliolate below with translucent margins. *Petals* five, white or cream or slightly reddened, orbicular, oblong, elliptic, ovate or broadly lanceolate, sessile or sometimes sub-sessile, connate with the lobes of the disc, glabrous or puberulous or in one case with up to seven long hairs, usually sparsely ciliolate below, spreading except in one case where delapsing when in bud. *Staminodes* absent or seen as a vestigial gland on the outer edge of the lobes of the disc. *Filaments* five, 1–2 mm long, acicular, glabrous except in one case with a few minute hairs. *Anthers* five, 0,5–1,4 mm long, 0,5–1,1 mm broad, bi-locular, splitting lengthwise, dorsifixed; apical gland sessile except in *D. dichotoma* where the apex tapers to a recurved gland and *D. thyrsophora* where the gland is inflexed. *Pollen* 43–66 μ long, 22–35 μ broad, oblong, triporate. *Disc* well developed, sinuate-crenulate, 5-lobed, fleshy, nectariferous, standing open, exceeding the ovary by a long way. *Stigma* capitellate, 0,15–0,3 mm diam. *Style* 0,5–2 mm long, usually at some stage deflexed, glabrous except in *D. strumosa* where very sparsely and minutely pubescent. *Ovary* 5-carpellate, 0,5–1 mm long, 0,5–1,2 mm diam., usually glabrous, or sometimes with the apices fringed with a few hairs or in one case echinulate, often glandular with the gland persisting and immersed at the apex of the horn of the ripe fruit. *Fruit* 5-carpellate; carpels glabrous or rarely puberulous, striate-veined, pitted with gland dots or rarely with warty swellings; horns erect or spreading, long or short. *Seed* 3,5–7,7 mm long, 1,6–3 mm broad, black, shining except in *D. acmaeophylla, D. ramosissima* and *D. meyeriana* where matt and in *D. tenella* where striate.

Diagnostic Characters

Characters which distinguish the genus *Diosma* are: flowers less than 10 mm diam, with petals spreading, with the disc conspicuous, sinuate-crenulate, overtopping the ovary, without staminodes or with the staminodes vestigial, with the style and filaments very short not exceeding the petals and the ovary 5-carpellate. It differs from *Adenandra* which has anthers with a stipitate gland, from *Acmadenia, Agathosma* and *Coleonema* which have terete, acicular or petaloid staminodes, from *Euchaetis* which has transversely bearded petals, from *Macrostylis* and *Phyllosma* which have very long styles and filaments, from *Sheilanthera* which has the petals clawed and from *Empleurum* which has the ovary normally unilocular.

Arrangement of Sections

The genus may be conveniently divided into two sections:

1. *Diosma* section *Diosma* which is distinguished by having flowers without staminodes (species no's. 1–15).

2. *Diosma* section *Tumella* which is distinguished by having flowers with vestigial staminodes (species no's. 16–28).

KEY TO THE SPECIES OF *DIOSMA*

1	Staminodes absent. (Section 1)	2
1+	Staminodes vestigial. (Section 2)	16
2	Leaves mostly opposite	3
2+	Leaves alternate	5
3	Leaves 1,5–4 mm long	**15. dichotoma**
3+	Leaves more than 5 mm long	4
4	Plant many stemmed, resprouting after fires	**14. oppositifolia**
4+	Plant single stemmed at base, not resprouting after fires	**9. subulata**
5	Seed surface matt	6
5+	Seed surface shining	8
6	Petals glabrous	**3. meyeriana**
6+	Petals minutely pubescent	7
7	Leaves with a sharp recurved mucro	**1. acmaeophylla**
7+	Leaves obtuse or with a small callus	**2. ramosissima**
8	Petals with from 2 to 7 long weak hairs	**13. pilosa**
8+	Petals without long weak hairs	9
9	Flowers 2,5 mm diam., disc profusely pitted	**7. parvula**
9+	Flowers more than 3 mm diam., disc with few pits	10
10	Leaves ovate or ovate-lanceolate	11
10+	Leaves linear, linear-lanceolate or subulate	12
11	Leaves ovate 3–4 mm long	**12. sabulosa**
11+	Leaves ovate-lanceolate up to 8 mm long	**10. awilana**
12	Bracts, bracteoles and calyx lobes long-crisped ciliate	**11. arenicola**
12+	Bracts, bracteoles and calyx lobes not long-crisped-ciliate	13
13	Leaves sessile	**8. fallax**
13+	Leaves short-petiolate	14
14	Leaves often abruptly recurved at the apex, flowers 9–10 mm diam.	**4. aspalathoides**
14+	Leaves with a straight point, flowers 6–7 mm diam	15
15	Leaves with a narrow midrib when dry, petals not persisting beneath the ripening fruit	**5. pedicellata**
15+	Leaves with a broad midrib when dry, petals persisting beneath the ripening fruit	**6. hirsuta**
16	Flowers with petals only when in bud	**26. apetala**
16+	Flowers with petals at anthesis	17
17	Seed minutely wrinkled, not shining	**19. tenella**
17+	Seed smooth, shining	18
18	Leaves with a sharp point	19
18+	Leaves obtuse or mucronate with a small blunt callus	20
19	Leaves subulate-aristate up to 19 mm long	**16. aristata**
19+	Leaves linear-lanceolate acute up to 10 mm long	**17. rourkei**
20	Leaves mucronate with a small blunt callus	21
20+	Leaves obtuse	23
21	Leaves opposite, sessile, glabrous	22
21+	Leaves alternate, short-petiolate, sparsely setose on all sides	**22. echinulata**
22	Leaves 2,5–3,7 mm broad	**23. guthriei**
22+	Leaves 1,8–2,2 mm broad	**24. haelkraalensis**
23	Leaves short petiolate	24
23+	Leaves sessile	25
24	Leaves recurved, petals gland-dotted	**20. recurva**
24+	Leaves straight, petals without gland dots	**25. demissa**
25	Leaves linear-lanceolate, branchlets crowded	**18. thyrsophora**

25+ Leaves oblong, elliptic or lanceolate-obtuse 26
26 Leaves oblong, midrib lumpy with gland dots .... **21. prama**
26+ Leaves elliptic or lanceolate-obtuse 27
27 Leaves elliptic, style and filaments glabrous .... **27. passerinoides**
27+ Leaves lanceolate-obtuse, style and filaments very sparsely pubescent .... **28. strumosa**

1. **DIOSMA** sectio **DIOSMA**

Section *Diosma* is distinguished in having the flower without staminodes.

1. *D. acmaeophylla*
2. *D. ramosissima*
3. *D. meyeriana*
4. *D. aspalathoides*
5. *D. pedicellata*
6. *D. hirsuta*
7. *D. parvula*
8. *D. fallax*
9. *D. subulata*
10. *D. awilana*
11. *D. arenicola*
12. *D. sabulosa*
13. *D. pilosa*
14. *D. oppositifolia*
15. *D. dichotoma*

1. Diosma acmaeophylla Eckl. & Zeyh., Enum. Plant.: 108 (1835). Type: In solo arenoso (altit. II, III) laterum montium prope Brakfontein (Clanwilliam), Jul, *Eckl. & Zeyh. 849* (K, lectotype; C, G, LD, P, PRE, S, SAM, isotypes).

Shrubs 0,5–2,5 m tall, erect, arising from a single stem towards the base, a stem 45 mm diam. showed ± 20 growth rings. *Branches* forked, curved upwards, glabrous; bark smooth, reddish-brown, leafless. *Branchlets* slender, erect, quite short, minutely, puberulous, not hidden by the leaves. *Leaves* 5–26 mm long, 0,8–1,3 mm broad, linear, sub-terete, sessile, alternate in 5 spirals, erect; apex acute with a sharp recurved mucro; margins rounded, narrowly or not in the least translucent, eciliate or sparsely ciliolate or serrulate; adaxial surface rounded, glabrous, with gland dots scattered in two or more rows. *Inflorescence* solitary, sessile, terminal on very much reduced branchlets in groups. *Bract* 1,6 mm long, 0,8 mm broad, ovate-lanceolate, acute, apiculate; margins ciliolate mainly below; adaxial surface crisped pubescent; abaxial surface glabrous, gland-dotted. *Bracteoles* two, 1,1 mm long, 0,7 mm broad, ovate, acute with a very small callus at the apex, ciliolate, adaxially pubescent, abaxially sparsely pubescent to either side of the midrib. *Calyx lobes* five, 1,4 mm long, 1,2 mm broad, ovate, apiculate, ciliolate, pubescent on both surfaces, gland-dotted, margins broadly translucent. *Petals* five, 2,5 mm long, 1,9 mm broad, sub-orbicular, sparsely ciliolate-serrulate above, abaxially puberulous above, pure white. *Staminodes* none. *Filaments* five, becoming 1,5 mm long, acicular, glabrous. *Anthers* before anthesis 1,1 mm long, 0,7 mm broad, yellow; apical gland globose, sessile, translucent. *Pollen* 61 μ long, 30 μ diam., oblong. *Disc* 5-sinuate-crenulate, bright green, exceeds the ovary by a long way, stands open, exudes nectar. *Stigma* 0,3 mm diam., capitellate, green. *Style* at first deflexed becoming 1,5 mm long, glabrous. *Ovary* 5-carpellate, 0,6 mm long, 0,8 mm diam., glabrous, apices globose. *Fruit* 5-carpellate, 8–11,5 mm long, glabrous, 1–2 mm pedicellate above the calyx; *horns* 2–6 mm long, projecting at 45° with an immersed gland at the apex. *Seed* 7,3–7,7 mm long overall, 2,6–2,9 mm broad, black, matt; aril black and white streaked.

This rather distinctive species with sessile, linear leaves was collected by Zeyher in the year 1829 near Brakfontein which lies 12 km north of where Citrusdal now stands. Having the apex of the leaf recurved with a sharp point must have led Sonder to consider it to be conspecific with *Diosma aspalathoides* Lam. and so it has remained in synonymy for over one hundred years. In herbaria it was also confused with *Diosma hirsuta* L. under the name *Diosma vulgaris* Schldl. The above description prepared from fresh material amplifies the very good diagnosis previously given by Ecklon and Zeyher.

SPECIMENS EXAMINED

CAPE—2917 (Springbok): Spektakelberg, 2 miles S. of Naries (-DA), 9/9/1970, *Thompson 1032* (PRE); Little Namaqualand, Buffels River, 6/9/1945, *Leighton 1191* (BOL); Komaggas Mountains (-DC), 700 m, –/7/1926, *Meyer s.n.* (PRE-*Marloth 6955*).

—3017 (Hondeklipbaai): Namaqualand, 3 miles E. of Kamieskroon (-BB), 3 500 ft., 24/9/1948, *Acocks 14989* (PRE); Bowiesdorp, –/9/1941, *Stokoe 8175* (BOL); Sneeuwkop, Khamiesberg, 14/10/1928, *Hutchinson 865* (BOL); Brakdam, Little Namaqualand (-BD), 24/8/1941, *Esterhuysen 5684* (BOL).

—3018 (Kamiesberg): 3 miles S.E. of Leliefontein (-AC), 4 300 ft., 24/3/1948, *Acocks 14206* (PRE); Kasparskloof, 3–4 000 ft., –/8/–, *Drège 7135* (S); Kamiesbergen, Garies/Leliefontein, top of pass, –/11/1939, *Esterhuysen 1400* (BOL, PRE); Koornslandskloof, 25 miles N.E. of Garies, 4 000 ft., 14/8/1967, *v.d. Westhuizen 1* (PRE), *van Breda 4056* (PRE).

—3118 (Vanrhynsdorp): 21 miles S.S.W. of Vredendal, Vanrhynsdorp Division (-DC), 500 ft., 26/8/1958, *Acocks 19709* (PRE); Klaver, 29/10/1944, *Leipoldt 4112* (BOL), 1/8/1920, *Andrae 499* (PRE); Pass above Trawal, 1 100 ft., 21/8/1976, *Williams 2191* (NBG); The Waterfall, S. end of Matsikamma Mountains (-DD), [illegible] ft., 20/8/1976, *Williams 2190* (NBG); Matsikamma plateau, top of Katberg Pass, [illegible]/8/1976, *Goldblatt 3848* (MO).

—3119 (Calvinia): Van Rhyns Pass (-AC), 2 200 ft., 23/8/1972, *Williams 1677* (NBG, PRE); Lokenberg (-CA), 2 100 ft., 18/9/1955, *Leistner 342* (PRE), 29/8/1953, *Acocks*

17053 (PRE), 1/8/1953, *Acocks 16876* (PRE), 28/8/1958, *Acocks 19716* (BOL, PRE); Botterkloof Pass (-CD), 2 500 ft., 20/8/1976, *Williams 2189* (NBG), 31/3/1973, *Taylor 8388* (PRE), 24/9/1952, *Maguire 1900* (NBG).

—3218 (Clanwilliam): Zeekoevlei (-BA), –/7/1941, *Esterhuysen 5616* (BOL, PRE); Langkloof in saxosis (-BB), 800 ft., 5/7/1896, *Schlechter 8036* (BM, BOL, G, GRA, P, PRE, S); Boschkloof, III, A, d, 1, 1 500–2 000 ft., 26/11/1828, *Drège 1890* (P, PRE); Pakhuis Pass, farm Kleinkliphuis, 31/10/1963, *Schlieber and van Breda 9904* (PRE), –/3/1964, *Hardy 1721* (PRE); 1 km S. of Swartbaskraal (-BC), 800 ft., 14/8/1973, *Williams 1848* (NBG, PRE, S, STE); Sandveld between Greys Pass and Graafwater, –/8/1940, *Leipoldt 3353* (BOL); Paliesheuwel (-BD), 10/9/1950, *Maguire 425* (BOL); N. boundary of Bergvalley, Paliesheuwel, 1 100 ft., 11/7/1975, *Williams 2009* (NBG); N. slope of Schimmelberg, 12/10/1939, *Pillans 9115* (BOL); 0,9 m from St Helena Bay to Slipper Bay (-CA), 400 ft., 14/6/1967, *Thompson 282* (PRE), 200 ft., 11/8/1977, *Williams 2329* (NBG); Piekenierskloof (-DB), 1 300 ft., 26/6/1896, *Schlechter 7944* (BM, BOL, G, GRA, S), 1 100 ft., 23/8/1894, *Schlechter 4961* (BOL, GRA); Greys Pass, 5/10/1952, *Esterhuysen 20592* (BOL).

—3219 (Wupperthal): Boentjiesrivier in arenosis (-AA), 2 600 ft., 25/8/1896, *Schlechter 8677* (G, PRE); Heuningvlei/Boontjieskraal, 31/11/1941, *Esterhuysen 7521* (BOL, GRA, PRE, SAM); Pakhuis Pass, Clanwilliam Division, 28/12/1941, *Esterhuysen 7388* (BOL, PRE, GRA), 9/2/1941, *Leipoldt 3657* (PRE), 3 500 ft., –/12/1940, *Leipoldt 3345* (PRE), 3 000 ft., 30/9/1940, *Compton 9596 on L.H.S.* (PRE), 28/9/1940, *Esterhuysen 3144* (BOL, PRE), 28/9/1940, *Esterhuysen 3145* (PRE), 3 000 ft., 28/12/1948, *Esterhuysen 14984* (BOL), 28/9/1940, *Esterhuysen 3145, 3146, 3147* (BOL), –/12/1940, *Esterhuysen 3345* (BOL), 2 500–3 000 ft., 16/1/1953, *Esterhuysen 21148* (BOL, PRE); Pakhuis/Heuningvlei, 28/12/1941, *Esterhuysen 7388* (PRE), *7434, 7743* (BOL); In solo arenoso (altit. II, III) laterum montium prope Brakfontein, Clanwilliam (-AC), Jul., *Ecklon & Zeyher 849* (C, G, K, LD, P, PRE, S, SAM); Cedarberg, Crystal Pool, 4 300 ft., 14/2/1973, *Williams 1762* (NBG, PRE); Wupperthal, –/7/1916, *Marloth 7147* (PRE), *Drège 7133* (S), –/11/1929, *Thode A1971* (PRE); Uitkyk Pass, Cedarberg, 2 000 ft., 7/7/1935, *Compton 5332* (BOL); Sederhoutkloof, 3 000–4 000 ft., 3/9/1963, *Taylor 5120* (PRE); S. Cedarberg, Sneeuwberg Hut, 4 250 ft., 1/12/1976, *Williams 2247* (NBG); Cedarberg, base of Wolfberg (-AD), –/3/1940, *Esterhuysen 2516* (BOL, PRE); Citrusdal, Donderhoek Peak (-CA), to 6 000 ft., –/1/1944, *Stokoe 9418* (PRE); Kromrivier (-CB), 3 350 ft., 18/9/1975, *Williams 2086* (NBG), 4/10/1952, *Esterhuysen 20559* (BOL), –/9/1934, *Leighton s.n.* (BOL *21585*); Zoo Ridge, Suurvlakte, E. Cold Bokkeveld, Ceres Division (-CD), 3 500 ft., 18/9/1964, *Taylor 5906* (PRE); Rocky ridge on farm Suurvlakte above Winkelhaaks River (-DC), 20/4/1946, *Esterhuysen 12705* (BOL); near Winkelhaaks River on road to Swartruggens, 18/11/1961, *Esterhuysen 29302* (BOL, PRE).

—3319 (Worcester): Ceres Karroo, Spes Bona at foot of Swartruggens (-BA), 23/10/1922, *Marloth 9091* (PRE); Ceres Karroo, Vaalkloof, N. slope of Bontebergen (-BB), 1 000 m, –/8/1919, *Marloth 9091* (PRE).

—3320 (Montagu): Matjiesfontein, Witteberg (-BC), 1 050 m, –/7/1903, *Marloth 2962* (PRE), 21/6/1908, *Pearson 1584* (PRE), 3 000 ft., 11/8/1924, *Compton 2526* (BOL), 1/5/1941 *Esterhuysen 5163* (BOL, PRE), 24/10/1943, *Leighton 259* (BOL, PRE), 11/5/1941, *Walgate 250* (NBG).

Distribution and Variation

Diosma acmaeophylla is found growing in dry situations in sandy quartzitic soil derived from granite or from the Table Mountain geological series at altitudes varying from 120 to 1 300 m (400–4 300 ft.) above sea level. The main concentration is within a radius of about 60 km of Clanwilliam. Outliers occur in Namaqualand far to the north, at St Helena Bay to the south west and at Matjiesfontein to the south east.

There appears to be a considerable degree of variation in the size of the leaves. This may be to some extent related to the age of the plant, the oldest plants having the smallest leaves. The leaves of plants from most populations are extremely glabrous and have thick eciliate margins. However, those from the Waterfall near Vanrhynsdorp *(Williams 2190)* are thinly puberulous on all sides and those from the Witteberg near Matjiesfontein *(Walgate 250)* and from Van Rhyns Pass *(Williams 1677)* are ciliolate. It was

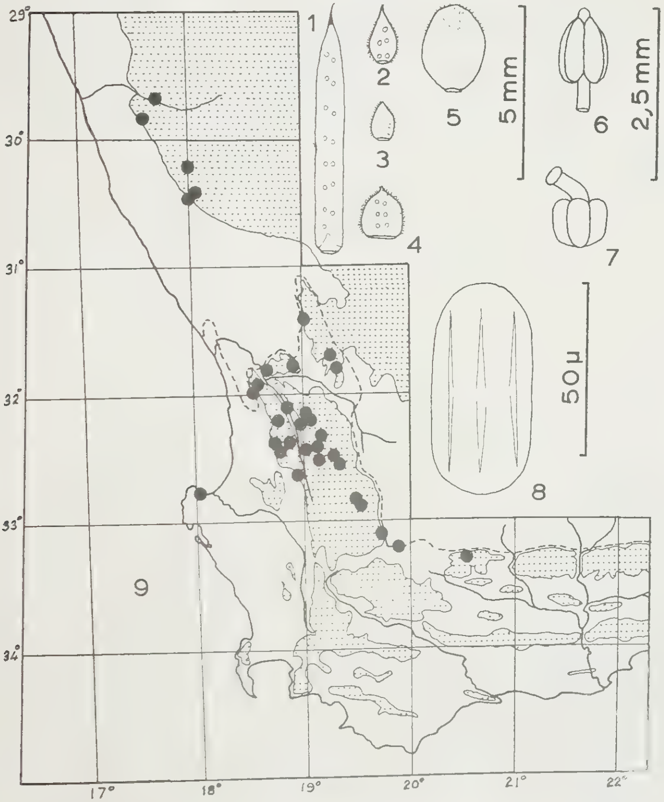

Fig. 2.

Diosma acmaeophylla: 1, leaf. 2, bract. 3, bracteole. 4, calyx lobe. 5, petal. 6, anther. 7, gynoecium. 8, pollen. 9, distribution.

also noted that the leaves of plants from Swartbaskraal *(Williams 1848)* had a pleasant sweet smell rather like *Coleonema album* when crushed and that those from the Cedarberg near Krom River *(Williams 2088)* had a strong smell of camphor.

Diosma acmaeophylla is regarded as a distinct species being a tall shrub, single-stemmed at base with leaves sessile, pubescent and flat on the adaxial surface, apex with a thin sharp mucro, margins thick and with petals pubescent outside towards the apex. It differs from *D. hirsuta* L., *D. aspalathoides* Lam. and *D. pedicellata* Williams which have glabrous leaves and petals.

2. Diosma ramosissima Bartl. & Wendl. Diosmeae in Beitr. Bot. **1**: 48 (1824) excl. syns. Type: ad Cap. b. Spei, leg. *Hesse, acc. 1823* (GOET, lectotype; C, GOET-WENDL, LD, P-JUSS, S, isotypes).

Diosma flavescens Oliv. in Hook Ic. Pl. t.1467 (1885).

Type: CAPE—3319 (Worcester): ad pedes montium prope Ceres (-AD), 24/3/1883, *H. Bolus 5317* (BOL, G, GRA, P, SAM).

Icon: *D. flavescens* Oliv. loc. cit.

Shrubs to 1,5 m tall with many branches arising from near the base. *Branches* spreading-erect, often ternate, with a smooth brown bark. *Branchlets* numerous, slender, erect, short, minutely puberulous, leafy. *Leaves* 1,8–5 mm long, 0,7–1 mm broad, linear, straight, obtuse, sub-terete, adpressed-erect, alternate; apex somewhat callused, very short–pubescent; margins obscure; abaxial surface rounded with two rows of gland dots. *Inflorescence* terminal solitary or twin, sessile, white. *Bract* 0,9 mm long, 0,7 mm broad, sub-deltoid; apex obtuse with a small pubescent callus; adaxial surface somewhat adpressed pubescent; abaxial surface gland-dotted, puberulous towards the margins. *Bracteoles* two, 0,7 mm long, 0,5 mm broad, sub-ovate, gland-dotted, puberulous. *Calyx* sparsely puberulous. *Calyx lobes* five, 1,3 mm long, 1,2 mm broad, deltoid; margins crisped ciliolate, translucent below; adaxial surface velvety pubescent; abaxial surface gland-dotted, sparsely puberulous. *Petals* five, 2,2 mm long, 1,3 mm broad, elliptic, obtuse, arising on a lobe of the disc; margins minutely serrulate, irregularly ciliolate above; abaxial surface sparsely puberulous mainly towards the midrib and apex. *Staminodes* none. *Filaments* five, becoming 1,5 mm long, acicular, glabrous. *Anthers* five, before anthesis 0,8 mm long, 0,6 mm broad, somewhat scabrid, yellow; apical gland 1,2 mm diam., sessile. *Pollen* 52 μ long, 23 μ broad, oblong. *Disc* 5-sinuate-crenulate, stands wide open, exceeds the ovary by a long way, green, exudes nectar. *Stigma* 0,25 mm diam., capitellate, globose, green. *Style* at first deflexed, becoming 1,5 mm long, slender, glabrous. *Ovary* 5-carpellate, 0,8 mm diam., 0,6 mm long, glabrous; apices obtuse. *Fruit* 5-carpellate, 8 mm long, glabrous, gland-dotted; *horns* 3 mm long, spreading with an immersed gland at the apex. *Seed* 7 mm long, 2,5 mm broad, black, matt, somewhat bean-shaped.

Unfortunately one cannot say when or where the type material for this species was collected. We only know that the Reverend D. H. F. Hesse of Meine, Hanover in Germany arrived at the Cape in 1800, that whilst at the Cape he is said to have made a name for himself as an entomologist and botanist and that he returned to Germany with his family in 1817. [Dict. S.A. Biog. **3**: 390 (1971)]. Although the type locality where Bolus collected *Diosma flavescens* has been well documented, no further collection of this species in this area has ever been made. The above description prepared from fresh material amplifies those previously given.

SPECIMENS EXAMINED

CAPE—2917 (Springbok): 9,5 miles W.N.W. of Bulletrap School, Schaap River, Namaqualand (-BC), 2 000 ft., 20/9/1957, *Acocks 19524* (BOL, PRE); in collibus prope Okiep, Namaqualand Minor (-DB), 3 000 ft., –/9/1883, *H. Bolus 9484½* (BOL).

—3118 (Vanrhynsdorp): 21 miles S.S.W. of Vredendal, Vanrhynsdorp Division (-CD), c.500 ft., 26/8/1958, *Acocks 19709 A* (LD, PRE); Zandkraal, Vanrhynsdorp Division (-DA), 400 ft., 17/9/1948, *Acocks 14807* (PRE); Heerenlogementsberg, Vanrhynsdorp (-DC), 1 000–2 000 ft., 13/9/1962, *Taylor 3945* (PRE, STE), 21/7/1940, *Esterhuysen 5546* (PRE, BOL), 10/8/1977, *Williams 2362* (NBG); de Hangen, N. slopes of Nardouwsberg, Clanwilliam, 27/9/1969, *Esterhuysen 32254* (BOL); Kraaibos Pass summit, Clanwilliam (-DD), 1 750 ft., 19/8/1976, *Williams 2188* (NBG).

—3319 (Calvinia): Lokenberg, Calvinia Division (-CA), 2 200 ft., 29/7/1956, *Acocks 18910* (PRE).

—3218 (Clanwilliam): sandveld along road to Graafwater, Clanwilliam Division (-BA/BB), 20/7/1941, *Esterhuysen 5596* (BOL, NBG, PRE, SAM), 28/8/1974, *Goldblatt 2444* (MO); 15 km from Clanwilliam on road to Lamberts Bay, 15/8/1973, *Williams 1853* (NBG); in collibus pone Zeekoevley, Clanwilliam Division 100 ft. (?), 26/4/1897, *Schlechter 10547* (BM, G, GRA, P, PRE, S): top of Nardouws Pass, Clanwilliam Division (-BB), –/8/1934, *Pillans 7094* (BOL), –/9/1947, *Stokoe s.n.* (SAM *64123*), –/8/1949, *Stokoe s.n.* (SAM *64126*); 8,5 km from Clanwilliam on road to Lamberts Bay, 1 200 ft., 15/8/1973, *Williams 1854* (NBG, PRE, S, STE), –/7/1948, *Lewis 3092* (SAM), 22/8/1976, *Williams 2194* (NBG); Pakhuis Pass, rocky slopes around Leipoldt's grave, 28/8/1974, *Goldblatt 2453* (NBG); Olifantsrivier, Clanwilliam Division (-BD), 300 ft., 2/7/1896, *Schlechter 7991* (BM, BOL, G, GRA, P, PRE, S, W); Ramskop, Clanwilliam, 500 ft., 10/12/1962, *Grobler 51* (PRE), *37* (STE); along National road c. 12 km S. of Clanwilliam, 1 500 ft., 26/7/1973, *Taylor 8521* (STE); Langkloof near Klawer vlei, Clanwilliam Division, 600 ft., 18/8/1976, *Williams 2186* (NBG); Piquetberg (-DD), 400 ft., 24/6/1896, *Schlechter 7900* (BOL, G, GRA, P, PRE).

—3219 (Wupperthal): Pakhuis near Village, Clanwilliam Division (-AA), 1[illegible]/9/1947 *Barker 4686* (BOL, NBG), *4687* (BOL, NBG, STE), –/9/1949, *Lewis 309*[illegible] (SAM), 6/9/1951, *Johnson 251* (NBG); Suurvlakte, E. of Bokkeveld Sneeuwkop, Ceres Division (-CD), 20/4/1946, *Esterhuysen 12697* (PRE); Zoo Ridge, Suurvlakte N. Cold Bokkeveld, Ceres Division, 14/9/1975, *Esterhuysen 33960a* (BOL); Knolfontein, Swartruggens, Ceres Division (-DC), 4 000 ft., 26/4/1972, *Williams 1652a* (NBG,

PRE); Groenfontein, Swartruggens, Ceres Division, 4 000 ft., 20/11/1974, *Williams 1931* (NBG, PRE); Swartruggens, Ceres Division, c. 4 000 ft., 19/11/1961, *Esterhuysen 29348* (BOL); Stompiesfontein, Swartruggens, Ceres Division, 18/11/1961, *Esterhuysen 29306* (BOL), 3 500 ft., 18/11/1961, *Esterhuysen 29329* (BOL); Rietvlei, Cold Bokkeveld, at the cottages, Ceres Division, 27/9/1978, *Esterhuysen 34992* (BOL); sandy rocky slopes, *Esterhuysen 34991* (BOL).
—3319 (Worcester): ad pedes montium circa pagum Ceres (-AD), 1 500 ft., 24/3/1883, *H. Bolus 5317* (BOL-HNAA *403*, G, GRA, P, SAM); in clivis montis Mostertsberg, Tulbagh Division, c. 2 500 ft., 31/1/1892, *Schlechter 385* (GRA, P); Langkloof, Skerpenheuvel, S. of the Breede River, Worcester Division (-DC), 1 000 ft., 25/11/1980, *Williams 3102* (NBG).

Without precise locality: e Cap. b. Sp. *Hesse s. n.* (C, GOET, GOET-WENDL, LD, P-JUSS, S).

Distribution and Variation

Diosma ramosissima is found growing in dry sandy or rocky places at altitudes of from about 120 m to 1 200 m (400–4 000 ft.) above sea level. Although mainly centred in the Clanwilliam Division, populations are widely dispersed from Namaqualand in the north to near the Breede River south of Worcester. The largest discontinuity is from near Okiep to near Vanrhynsdorp, a distance of about 250 km.

A certain amount of variation has been noticed. Some populations have leaves which are not obtuse but terminate in a sharp mucro. This peculiarity has not been found in one geographical area but rather inexplicably in three

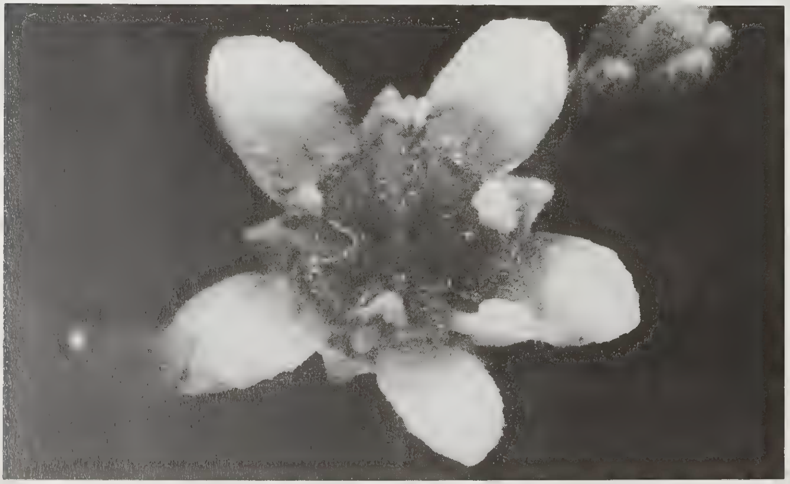

Fig. 3.
Flower of *Diosma ramosissima* showing disc exuding nectar.

widely separated localities. Examples are: 21 miles S.S.N. of Vredendal, 500 ft., *Acocks 19709,* 15 mm from Clanwilliam on road to Lamberts Bay, 1 100 ft., *Williams 1853* and Rietvlei, Cold Bokkeveld, 3 000 ft., *Esterhuysen 33960a*. The possibility of hybridisation with *D. acmaeophylla* cannot be overlooked.

Diosma flavescens collected once only near Ceres by H. Bolus differs only in being a more glabrous plant with relatively longer leaves. Both of these differences may be due to the plant growing in a very much more humid situation.

Specimens collected at Knolfontein in the Swartruggens *(Williams 1652a)* were found to have fruits with very short horns and leaves very short and obtuse.

Diosma ramosissima is a distinct species being a shrub up to 1,5 m tall with many branches spreading from near the base; with leaves linear, usually

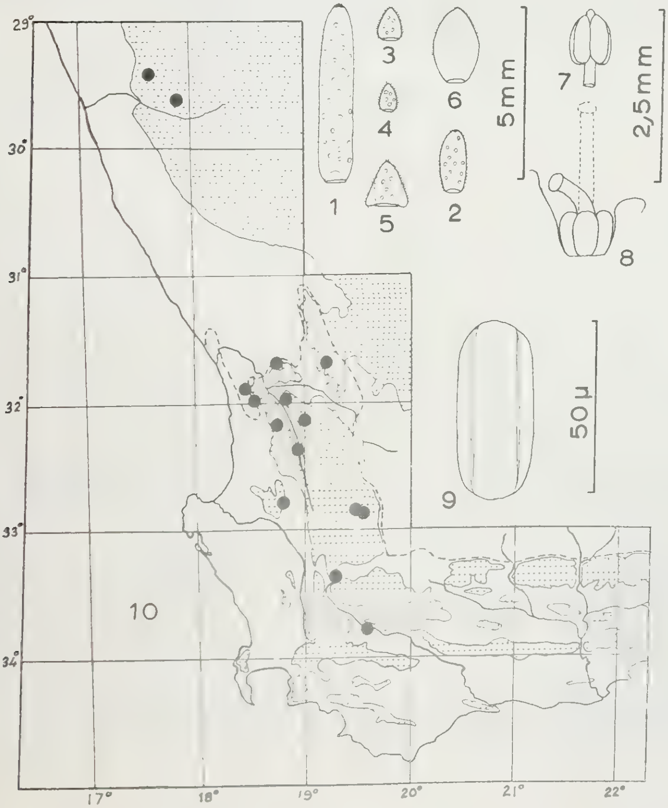

Fig. 4.
Diosma ramosissima: 1, large leaf. 2, small leaf. 3, bract. 4, bracteole. 5, calyx lobe. 6, petal. 7, anther. 8, gynoecium. 9, pollen. 10, distribution.

obtuse, adpressed-erect, sessile, alternate, with gland dots in rows to either side of the midrib; with flowers sessile, 1–2 nate, having petals sparsely puberulous outside towards the tip, and with a matt seed surface. It differs from *D. prama* which has leaves with gland dots scattered towards the midrib and a disc bearing vestigial staminodes. It differs from *D. dichotoma* which has opposite leaves.

3. Diosma meyeriana Spreng., Syst. Veg. **1**: 783 (1825). Type: labelled: *Diosma virgata G. F. W. Meyer. Ad Cap.b. Spei. Leg. Rev. Hesse. Comm. Cl. G. F. W. Meyer 1836* (GOET, lectotype; GOET-BARTL, P-JUSS, isotypes).

Diosma virgata G.F.W.Mey. ex Bartl. & Wendl. Diosmeae in Beitr. Bot. **1**: 46 (1824) nom. illegit. Type: *Diosma virgata* G.F.W.Meyer, Spicil. fl. cap. Ms., Habitat in Africa maxime australi, Hesse.

Not *Diosma virgata* Lam. Encycl. Meth. Bot. **2**: 286 (1786) which is *Agathosma virgata* (Lam.) Bartl. & Wendl. loc. cit.

Shrubs 0,4 to 1 m tall, diffuse, normally single-stemmed at base. *Branches* fairly erect, slender, quite long, glabrous, smooth, leafless, branching alternately, dark reddish-brown. *Branchlets* not very numerous, erect, straight, slender, glabrous, well clothed with leaves, reddened where exposed. *Leaves* 6–9,5 mm long, 1–1,3 mm broad, linear-lanceolate, acute, glabrous, ciliolate becoming more or less eciliate, erect, adpressed, imbricate on new shoots, sessile, alternate; apex with a straight sharp mucro; cartilaginous margins narrow with a sharp edge; adaxial surface fairly flat, concave when dry; abaxial surface rounded with two rows of gland dots. *Inflorescence* terminal, racemose-reduced; *flowers* crowded together on very short branchlets in varying numbers, opening at different times, each scarcely 4 mm diam. when open. *Bract* 1,7–2,3 mm long, 0,7–0,8 mm broad, lanceolate, acute, mucronate with a sharp point, ciliate, glabrous, adpressed, round backed, gland-dotted, cartilaginous margins fairly broad. *Bracteoles* two, 1,5 mm long, 0,7 mm broad, broadly lanceolate with a thick rib prolonged into a sharp pink mucro, glabrous, ± 1-gland-dotted, asymmetrical in outline; margins ciliate, broadly translucent. *Calyx lobes* five, 1,7 mm long, 0,6–0,8 mm broad, broadly lanceolate, glabrous; midrib gland-dotted; apex with a sharp point; margins ciliate, broadly translucent. *Petals* five, 2 mm long, 1 mm broad, oblanceolate-oblong, apiculate, sessile, white, glabrous, not spreading widely but closing up after anthesis and persisting for a long time, arising towards the summits of the lobes of the disc. *Staminodes* absent. *Filaments* five, becoming 1 mm long and spreading after anthesis, glabrous, subulate. *Anthers* five, 0,7 mm long, 0,5 mm broad, yellow; apical gland globose, minute, pale greenish. *Pollen* 45 μ long, 22 μ broad, oblong. *Disc* sinuate-crenulate, stands open, green, exceeds the ovary. *Stigma* 0,15 mm diam., capitellate. *Style* at first deflexed, later becoming erect, 0,8 mm long, glabrous. *Ovary* 5-carpellate, 0,5 mm long, 0,6 mm diam.; apices globose, green becoming reddened. *Fruit* 5-carpellate, carpels 7–9,5 mm long, pale yellowish-green, glabrous, gland-dotted, not shining; *horns* 1,5 mm long, fairly erect, reddened; apical gland immersed, facing outwards. *Seed* 4,7–5,7 mm long, 2,1 mm broad, black, matt; aril black with white streaks.

Sprengel did not agree with Bartling and Wendland who had published, in 1824 their new classification of the *Diosmeae* which they divided into several genera. Thus, in his edition of Linnaeus' *Systema Vegetabilium* published in 1825, Sprengel transferred all relevant epithets back into the genus *Diosma*. In doing so he found *D. virgata* Meyer to be a later homonym of *D. virgata* Thunberg and therefore proposed the new name, *D. meyeriana*. As the herbarium of G. F. W. Meyer housed at Berlin was destroyed during the 1939/45 war a duplicate preserved in the herbarium at Göttingen labelled *Diosma virgata G.F.W.Meyer. Ad Cap. b. Spei. Leg. Rev. Hesse. Comm. Cl. G. F. W. Meyer 1836* has been chosen as the lectotype. *D. meyeriana* Steud. cited by Sonder in error as a synonym of his *Coleonema juniperinum* is *D. meyeriana* Spreng.

The above description prepared from fresh material amplifies those previously given.

SPECIMENS EXAMINED

CAPE—3218 (Clanwilliam): about 7 miles W. of Clanwilliam on Lamberts Bay Road, Clanwilliam Division (-BB), 27/7/1948, *Stokoe s.n.* (SAM); hills from Graafwater to Clanwilliam, 1 000 ft., –/7/–, *Lamb 3579* (SAM); Grootkliphuis, 8 miles N. of Clanwilliam, in sandy restio veld, –/12/1940, *Leipoldt 3346* (BOL); Bergvalley/Zwartbaskraal, 3 km E. of main Road, 1 300 ft. (-BD), 11/7/1975, *Williams 2012* (NBG); Pikenierskloof, Clanwilliam Division (-DB), 2 000 ft., 29/6/1896, *Schlechter 7949* (BOL, G, GRA, P, PRE, S), 22/8/1966, *Pamphlett 108* (NBG); In convalle mont. Olifantsrivierbergen, 600 ft., 1/9/1894, *Schlechter 5116* (BOL, GRA); Sandstone slopes, Modderfontein, –/9/1930, *Gillett 3681* (BOL); N. end of Greys Pass near Citrusdal, 5/9/1964, *Esterhuysen 30740* (BOL); Greys Pass, 1 700 ft., 18/10/1958, *Acocks 19830* (PRE); Near Sewerfontein, 9 miles N. of Pikenierskloof Pass summit, 2 150 ft., 9/8/1977, *Williams 2321* (NBG).

—3219 (Wupperthal): Cedarberg, sandy flats between Heuning Vlei and Boontjieskloof, Clanwilliam Division (-AA), 31/12/1941, *Esterhuysen 7520* (BOL, PRE, SAM, NBG); N. Cedarbergen, sandy vlakte between Heuningvlei and Kompoort, 21/10/1945, *Esterhuysen 12120* (BOL, NBG, PRE), 19/10/1945, *Esterhuysen 12119* (BOL, SAM); Heuningvlei, –/1/1942, *Stokoe s.n.* (G, SAM); Ad montes prope Brakfontein, Clanwilliam Division (-AC), –/7/–, *Ecklon & Zeyher 848* (SAM, C, S); Waboomsrivier Mtns., N. of Brakfontein, 3 500 ft., 25/9/1936, *Compton 6517* (BOL, NBG); Cedarberg, Tafelberg shale band, 5 000 ft., 25/9/1942, *Esterhu*[illegible] *8094* (BOL); base of shale band, 29/12/1947, *Esterhuysen 14333* (BOL); shale ba[illegible] S. of Tafelberg, 5 000 ft., 24/6/1942, *Esterhuysen 7881* (BOL, NBG); Cedarberg, along the path to the Sneeuwberg hut, 4 000 ft., 23/3/1963, *Esterhuysen 30097* (BOL); [illegible] Cedarberg, near Sneeuwberg hut, 4 250 ft., 1/12/1976, *Williams 2247* (NBG); Cedarberg, Wolfberg plateau, in sand in valley near Wolfberg Arch (-AD), 27/12/1962,

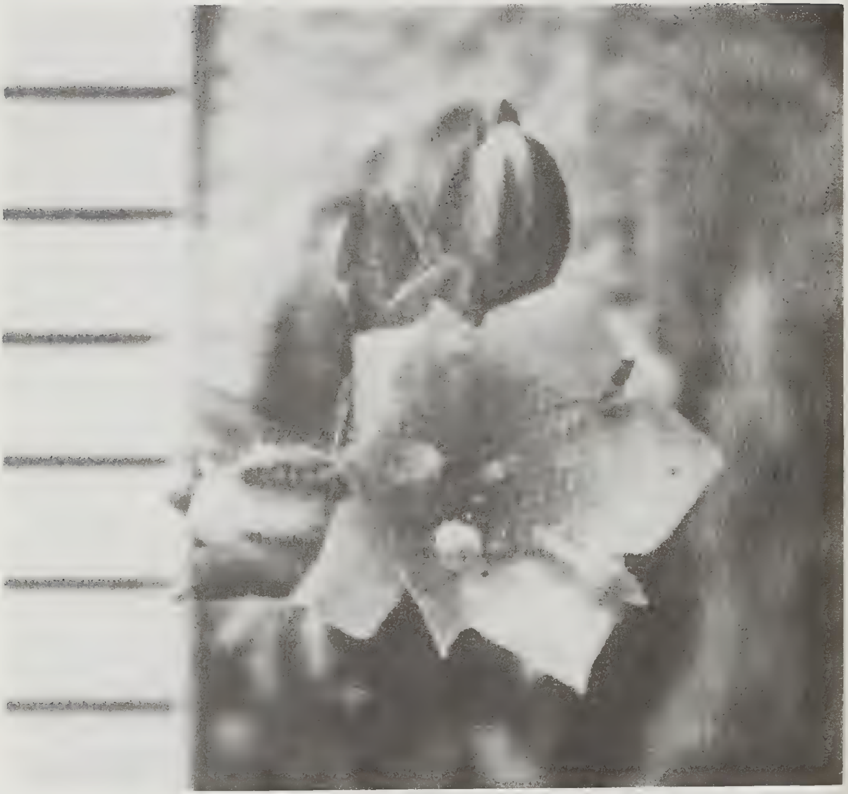

FIG. 5.
Flower of *Diosma meyeriana* with scale in millimetres.

Esterhuysen 29988 (BOL); Near the waterfalls between Citrusdal and Elandskloof, Clanwilliam Division (-CA), –/8/1940, *Stokoe 7675* (BOL, PRE, NBG); Duivelskloof, –/9/1950, *Stokoe s.n.* (SAM); S. Cedarbergen, shale band below Sneeuwberg, 5 000 ft., 11/12/1950, *Esterhuysen 18019A* (BOL); Elandskloof, 3/9/1938, *Hafström & Acocks 788* (PRE), 27/8/1954, *Lewis 4727* (SAM, STE), 20/8/1955, *Stokoe s.n.* (SAM), 4/8/1974, *Goldblatt 2235* (MO, NBG); Middelberg Pass, Citrusdal area, 3 050 ft., 12/7/1975, *Williams 2018* (NBG), 1/12/1976, *Williams 2255* (NBG); lower slopes Olifants River Mtns. near Warmbaths, 23/9/1911, *Stephens & Glover, Percy Sladen Memorial Expedition 7111* (BOL, GRA, NBG); The Baths, Modderfontein, 750 ft., 6/7/1935, *Compton 5331* (BOL, NBG).

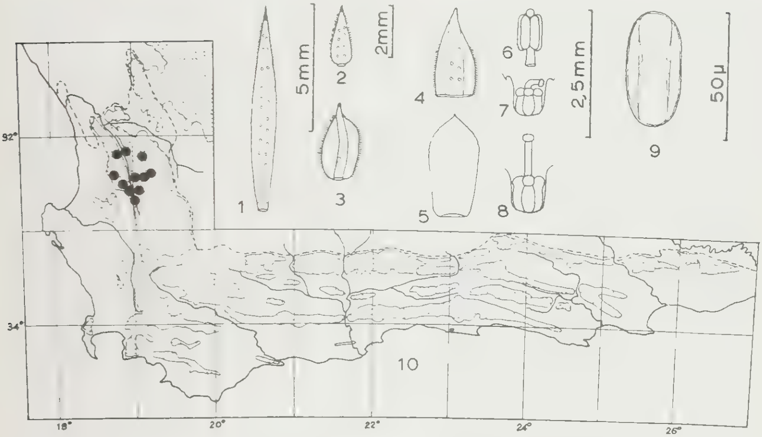

FIG. 6.
Diosma meyeriana: 1, leaf. 2, bract. 3, bracteole. 4, calyx lobe. 5, petal. 6, anther. 7, gynoecium at an early stage. 8, gynoecium at a later stage. 9, pollen. 10, distribution.

DISTRIBUTION AND VARIATION

Diosma meyeriana is confined to the Clanwilliam Division where it is found growing in sandy places in mountainous areas at altitudes of from 200 to 1 500 m (600 to 5 000 ft.). No significant variation has been observed. Plants are single-stemmed at base and do not coppice, but some from the outspan at the Middelberg Pass which were found to be many stemmed, may have been damaged by trampling.

Diosma meyeriana is recognised as a distinct species being a shrub arising from a single main stem, entirely glabrous; with leaves linear-lanceolate, sessile, alternate, adpressed erect with a small straight point; with flowers small, crowded, sub-sessile with petals glabrous, closing again after anthesis and persisting; with fruits not oily and with matt seeds. It looks very like *D. hirsuta* which however has leaves petiolate and *D. acmaeophylla* which has the petals pubescent.

4. Diosma aspalathoides Lam., Encycl. Meth. Bot. **2**: 286 (1786). Type: *Diosma aspalathoides Lam. Dict.* (P–LA, holotype; C, P–J, isotypes).

Diosma glabrata G.F.W.Meyer ex Bartl. & Wendl. Diosm. in Beitr. Bot. **1**: 34 (1824). Type: Cap. b. Spei, *Hesse s.n.* (GOET, GOET-W, LD).

Diosma depressa Eckl. & Zeyh., Enum. Plant.: 108 (1835). Type: In arenosis planitiei capensis prope "Rietvalley", altit. I (Cap), Nov. Dec., *Ecklon and Zeyher 851* (C, SAM).

Shrubs 1–1,3 m tall with several stems arising from an underground stump of great age, not burnt off for many years. *Branches* erect, variously bent, stiff, wiry, soon leafless, glabrous; bark light brown becoming grey, the uppermost knotty with leaf scars. *Branchlets* numerous, short, erect, very slender, pale green sparsely and minutely puberulous, not hidden by the leaves. *Leaves* vary from 10 mm long, 1,3 mm broad on young shoots to 2,7 mm long, 1,2 mm broad on short flowering branchlets, linear-elliptic, acute or sub-obtuse, short-petiolate, glabrous, alternate, spreading-erect; apex recurved, in longer leaves with a sharp point, in shorter leaves rather blunt with the mucro deflected outwards; hyaline margins smooth or irregularly denticulo-serrulate; abaxially round keeled with a row of gland dots to either side. *Inflorescence* terminal; *flowers* pedicellate, up to three in a reduced raceme, 9–10 mm diam., green in the centre with white petals; buds large, globose, slightly acute at the apex. *Bract* 2,5–2,8 mm long, 1,1–1,3 mm broad, lanceolate-oblong, obtuse with a blunt callus, glabrous, spreading; hyaline margins somewhat irregularly serrulate, very sparsely ciliolate at base; abaxial surface gland-dotted to either side of the prominent midrib. *Bracteoles* two, 1,7–2 mm long, 0,9 mm broad, lanceolate-oblong, obtuse with a small blunt callus, glabrous, spreading; hyaline margins rather narrow, irregularly serrulate; abaxial surface gland-dotted to either side of the midrib. *Calyx lobes* five, 2,2 mm long, 2 mm broad, deltoid, obtuse, glabrous; hyaline margins very sparsely and minutely ciliolate below; abaxial surface with two rows of gland dots. *Petals* five, 3,5 mm long, 3 mm broad, orbicular, glabrous, white, spreading, sessile, connate with the lobe of the disc at the base. *Staminodes* none. *Filaments* five, becoming 2,7 mm long, acicular, spreading, glabrous. *Anthers* five, 1,3 mm long, 1,1 mm broad, yellow; apical gland semi-immersed, globose. *Pollen* 53 μ long, 28 μ broad, elliptic. *Disc* 4 mm diam., sinuate-crenulate, standing open, green, fleshy, exudes nectar. *Stigma* 0,3 mm diam., capitellate, green, globose. *Ovary* 5-carpellate, 0,9 mm long, 1,2 mm diam., glabrous; apices obtuse. *Fruit* 5-carpellate, 14 mm long, 10 mm diam., glabrous, gland-dotted, short-pedicellate above the calyx; *horns* 1,5–4 mm long, spreading at 45°. *Seed* 5,8–6,3 mm long, 2,5 mm broad, black, shining; aril white.

It would appear that the type material for this species was collected by Sonnerat when he called at the Cape on his way to the East in 1773. The earliest collection may have been that of Auge which is to be found in the herbarium of the British Museum (Nat. Hist.). The above description prepared from fresh material amplifies those previously given.

SPECIMENS EXAMINED

CAPE—3318 (Cape Town): 3 miles E. of Langebaan (-AA), 10/10/1931, *Salter 3912* (BOL); near Hopefield (-AB), *Bachmann 297* (BOL); 13 miles S.E. by E. of

Hopefield, c. 100 ft., 13/10/1959, *Acocks 20676* (BOL); Ysterfontein, Darling, near beach (-AC), 30/9/1926, *Grant 2588* (BOL), –/7/1938, *Esterhuysen 2774* (BOL), 1/8/1938, *Cohen s.n.* (NBG); 4 miles E. of Ysterfontein, 27/8/1936, *Salter 6229* (BOL); Pampoenvlei, Darling (-AD), 11/9/1944, *Henrici 3756* (BOL, NBG); Mamre/Ysterfontein, –/8/1931, *L. Bolus s.n.* (BOL *21298)*; Darling, –/9/1937, *Eames s.n.* (BOL), 11/9/1950, *Johns s.n.* (NBG); Slangkop near Darling, 28/9/1953, *Compton 24379* (NBG); in dunis arenosis prope Groenkloof, Mamre (-CB), 300 ft., –/10/1878, *H. Bolus 4260* (BOL); in sabulosis (altit I, II) prope Groenekloof, Sept/Oct, *Ecklon & Zeyher 850* (W, SAM); Mamre, –/9/1939, *Walgate s.n.* (BOL); Mamre Road, 14/8/1946, *Leighton 1825* (PRE); Mamre hills, Malmesbury Division, 24/9/1945, *Compton 17441* (NBG); on road to Springfontein Strand near Mamre, Malmesbury Division, 600 ft., 11/8/1977, *Williams 2322* (NBG); near Melkbosstrand, Cape Division, –/9/1940, *Esterhuysen 4861* (BOL); near Bokbaai, 15/9/1940, *Esterhuysen 3832* (BOL, PRE); Buffelsrivier, strandveld near Bokbaai, 100 ft., 18/10/1962, *Taylor 4171* (PRE); Bokbaai, 21/2/1962, *Joubert 543* (STE); in arenosis planitiei capensis prope Rietvalley, altit. I (-CD), Nov/Dec, *Ecklon & Zeyher 851* (C, SAM); Kaapsche Vlakte bei Blaauwberg, 200 ft., (III, E, b), 25/7/1826, *Drège 7130* (P, W); South base of Koeberg, Cape Division (-DA), –/9/1926, *Pillans s.n.* (BOL); On road to Atlantis near Mamre, Malmesbury Division, 450 ft., 8/9/1975, *Williams 2064* (NBG), 9/12/1975, *Williams 2160* (NBG); Melkbosch turning, Cape Division, 21/7/1946, *Compton 18105* (NBG); Riverlands, Malmesbury Division, 2/11/1978, *Esterhuysen 35080* (BOL); 24 miles along the road to Malmesbury after the turn off from the N9, 3/10/1969, *Esterhuysen s.n.* (BOL); Vissershok, Cape Town/Malmesbury road (-DC), 23/9/1932, *Salter 2707* (BM, BOL); Milnerton, Cape Division, 19/9/1942, *Compton 13729* (NBG).

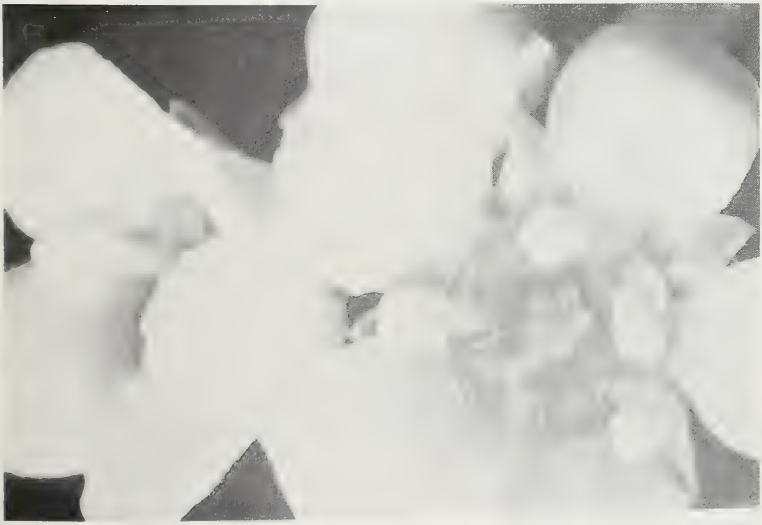

FIG. 7.
Flower of *Diosma aspalathoides* showing petals 3 mm diam.

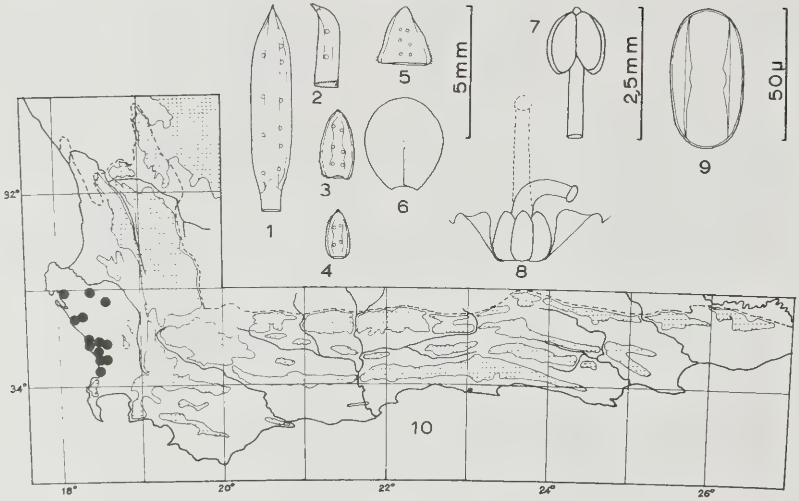

FIG. 8.
Diosma aspalathoides: 1, leaf. 2, leaf tip side view. 3, bract. 4, bracteole. 5, calyx lobe. 6, petal. 7, anther. 8, gynoecium with lobes of disc. 9, pollen. 10, distribution.

Without precise locality: *Auge s.n.* (BM), *Nelson s.n.* (BM), *Harvey 241* (BM), *Roxburgh s.n.* (BM), *Hesse s.n.* (GOET, LD), *Sieber 194* (K, P), *Sonnerat s.n.* (P–LA, P–J).

DISTRIBUTION AND VARIATION

Diosma aspalathoides is found only on the sandy coastal plain of the south western Cape, nearly always fairly close to the sea, from Milnerton in the south to Langebaan in the north. The plants grow in deep sand and possess a stout root which can withstand veld fires and the very disturbing activities of the mole rat.

The leaves on the same plant are variable. Those on vigorously growing shoots are the longest and possess a pungent mucro and those on the upper branchlets of mature plants are short and recurved with a blunt mucro.

D. pedicellata, a very similar species with a distribution extending inland as well as along the same coastal plain but distinguished by having smaller flowers and straight acute leaves, may well be found, when sufficient material becomes available, to grade into *D. aspalathoides.*

Diosma aspalathoides is considered to be a distinct species being a shrub with several stems arising from a stout persistent subterranean lignotuber, glabrous in most parts; having leaves short-pedicellate, round-backed or two-ribbed when dry with two rows of gland dots, the upper leaves usually recurved at the apex with a blunt point; having flowers pedicellate, about 10 mm diam., with petals more than 2,5 mm diam. and the disc 4 mm diam. It differs from *D. pedicellata* which has leaves with a straight point and a narrow midrib when dry and flowers in slender reduced racemes, 7 mm diam. with petals less than 2,5 mm broad. It differs from *D. acmaeophylla* which has sessile leaves.

Common name "Haasboegoe".

5. Diosma pedicellata Williams in Jl S. Afr. Bot. **45**.2: 175 (1979). Type: CAPE—3218 (Clanwilliam): 6 km north of Papkuilsfontein, near Aurora, Piquetberg Division (-CB), 76 m (250 ft.) alt., 11/8/1977, *Williams 2328* (NBG, holotype; K, MO, PRE, isotypes).

Diosma pedicellata is a distinct species and differs in being usually a tall stiff much branched shrub, many stemmed at base, having leaves petiolate with a narrow midrib when dry and the apex with a straight point; flowers 7 mm diam.; calyx glabrous; petals spreading, glabrous, narrowly sessile with margins irregular; fruit becoming pedicellate above the calyx; seed shining.

In *D. hirsuta* the petals persist for a long time at the base of the ripening fruit, a character often seen on herbarium material but in *D. pedicellata* the petals soon delapse and are never seen to be associated with the ripening fruit.

D. aspalathoides Lam, which occupies a rather similar habitat in deep sandy soils mostly in the vicinity of Mamre, can be distinguished by its larger

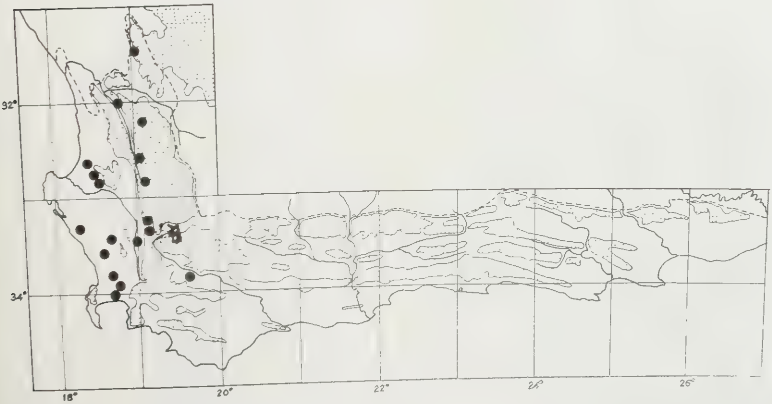

FIG. 9.
Diosma pedicellata: distribution.

flowers 9–10 mm diam., with petals 3 mm broad and by its leaves which are often sharply recurved at the apex.

D. acmaeophylla Eckl. & Zeyh., which occupies a habitat somewhat further to the north, has similar large fruits with long horns that are also pedicellate above the calyx but can be distinguished by having leaves sessile not petiolate and by the minute pubescence on the petals and calyx.

Additional Specimens Examined

CAPE—3219 (Wupperthal): Boontjieskloof N.E. of Pakhuis, Clanwilliam Division (-AA), 23/9/1969, *Esterhuysen 32208* (BOL).

—3319 (Worcester): South of Scherpenheuwel and the Breede River, Roodekleigat, Tafelkoppie, Worcester Division (-DC), 750 ft., 25/11/1980, *Williams 3101* (NBG).

6. **Diosma hirsuta** L., Sp. pl. **1**: 198 (1753); Esterhuysen in Adams and Salter Flor. Cap. Pen.: 537 (1950). Type: in Herb. Hort. Cliff. (BM, holotype).

Diosma rubra L., Sp. pl. **1**: 198 (1753). Iconolectotype: Pluk. almag. Bot. tab. 347, fig. "fol. 68. p 14".

Diosma ericoides L., Sp. pl. **1**: 198 (1753). Inconolectotype: Pluk. Phyt. tab. 279, fig. 5.

Diosma oppositifolia L., Sp. pl. **1**: 198 (1753) ex parte as to syn. Seb. Thes.

Diosma pectinata Thunb., Prod. Plant. Cap. **1**: 84 (1794). Type: Herb. Thunb. *5701* (UPS).

Diosma tenuifolia Willd., Enum. Plant. Berol.: 258 (1809). Type: Hort. Bot. Berol. *Willdenow 4793* (B).

Diosma longifolia Wendl., Coll. **1**: 61. t. 19 (1806). Type: Hort. Herrenh. (GOET-WENDL).

Diosma ericaefolia Andr., Bot. Rep. t. 451 (1807).

Diosma pinifolia Fisch., Cat. Gorensk. **1**: 94 (1808) nom. nud.

Diosma ambigua Bartl. & Wendl. Diosmae in Beitr. Bot. **1**: 42 (1824). Type: *Otto s.n.* (GOET-WENDL).

Diosma linifolia Hort. ex Bartl. & Wendl. Diosmeae in Beitr. Bot. **1**: 44 (1824) nom. nud.

Diosma vulgaris Schlechtendal in Linnaea **6**: 200 (1831), nom. superf. Type: as for *D. hirsuta, D. rubra, D. oppositifolia, D. longifolia* and as for *D. ambigua* above.

Diosma simsiana Eckl. and Zeyh., Enum. Plant.: 108 (1835) excl. syn. *D. ericoides* Sims. Type: in latere montis Tafelberg septentrionem spectante altit II. Cap. Febr. Mart. *Ecklon & Zeyher 847* (SAM).

Diosma macrosticta Presl., Bot. Bemerk.: 31 (1844), nom. superf. Type: *D. ambigua* Bartl. & Wendl.

Diosma vulgaris Schldl. var. *rubra* Sond. in Flor. Cap. **1**: 374 (1860).

Diosma vulgaris Schldl. var. *longifolia* Sond. in Flor. Cap. **1**: 375 (1860).

Diosma vulgaris Schldl. var. *hirsuta* Sond. in Flor. Cap. **1**: 375 (1860).

Pre-Linnaean Citations

Hijpericum afr: frutesc: odorat, fl. albo Cod. Witsen. (c. 1682–1687). Cat. Afr. Mus. **2**: 61. C 362 (1967).

Erica Aethiopica Rosmarini sylvestris folio, eleganter punctato; flore purpureo tetrapetalo. Pluk. Almag. Bot. t. 347. fo. 68. pl. 4 (1696) excl. syn.

Ericaeformis, Coridis folio, Aethiopica, Floribus pentapetalis in apicibus. Pluk. Almag. Bot.: 136 (1696).

Spirae africana lariceis foliis. Raj. Suppl. Dendr.: 91 (1704).

Spiraea afric: odorata foliis pilosis. Comm. Hort. Med. Amst.: 3 (1706), Boerh. Ind. Alt. Plant. **2**: 238 (1720), Mill. Dict. Ed. 2 (1733).

Hypericum, Africanum, vulgare; seu Bocho Hottentotorum; flore albo; frutescens. Seb. Thes. **2**: 41. t. 15. No. 5 (1735).

Diosma foliis linearibus hirsutis. Linn. Hort. Cliff.: 71 (1737), Roy. Lugd. Bat.: 435 (1740), Wach. Ultr. Ind.: 47 (1747), Fabr. Helmst.: 145 (1759).

Icones

Hijpericum . . . Cod. Witsen. (1682–1687).

Erica aethiopica . . . Pluk. Almag. Bot. t. 347 fig. fol. 68. pl. 4 (1696).

Ericaeformis . .. Pluk. Phyt. tab. 279, fig. 5 (1691).

Spiraea africana . . . Comm. Hort. Med. Amst. t. 3 (1706).

Hypericum . . . Seb. Thes. t. 15, No. 5 (1735).

Diosma hirsuta L. Gaertn. Fruct. **2**. t. 94 (1791), Wendl. Collect. t. 27 (1806), Lam. Rec. Plant. t. 127, Diosma 4 (1823), Bartl. & Wendl. Diosm. **1**. t. A, fig. 2 (1824), Levyns, Guide Flor. Cap. Pen.: 179, Fig. 90 (1966), Mason, West. Cap. Sandv. Flow. t. 60, fig. 2 (1972).

Diosma longifolia Wendl. Collect. t. 19 (1806).

Diosma ericaefolia Andr. Bot. rep. t. 451 (1807).

Diosma rubra L. Edw. Bot. Reg. **7**. t. 563 (1821), Lodd. Bot. Cab. t. 1298 (1828).

Coleonema album Bartl. & Wendl. ex errore in Chun Deutsch. Tiefs.-Exped.: 143 (1908).

Diosma vulgaris Schldl. Kidd, Wild Flow. Cap. Pen. t. 23, fig. 7 (1950).

Shrubs up to 0,5 m tall with many stems arising from a stout rootstock, last burnt about 4 years ago. *Branches* long, slender, erect, becoming glabrous when the epidermis splits off; leaf scars projecting as distinct lumps.

Branchlets fairly short, erect, scattered, densely crisped pubescent, yellow at first becoming reddish-brown, leafy, very short at the inflorescence. *Leaves* on vigorous young stems up to 22 mm long, more normally about 12 mm long, 0,9 mm broad, linear-lanceolate, alternate, erect; apex acute with a sharp erect mucro; margins narrowly cartilaginous, villous-ciliate at first; adaxial surface glabrous, more or less flat when fresh; abaxial surface convex showing a double midrib when dry, crisped pubescent at first, one row of gland dots to either side of the midrib; narrowing slightly at the base to a petiole about 1 mm long. *Inflorescence* terminal in very much reduced compound racemes; *flowers* 5 mm diam., pedicellate. *Bract* 1,2 mm long, 0,5 mm broad, lanceolate, glabrous, without gland dots; apex sub-obtuse, somewhat thickened; margins ciliolate, translucent below. *Bracteoles* two, 1 mm long, 0,5 mm broad, lanceolate, glabrous without gland dots, ciliolate; apex acute with a small translucent point. *Calyx lobes* five, 1,5 mm long, 1 mm broad, lanceolate, glabrous, gland-dotted; apex sub-acute, thickened, margins ciliolate, translucent. *Petals* five, 2,5 mm long, 1,7 mm broad, ovate, glabrous, white, without gland dots, spreading, connate at the base with the lobes of the disc; margins irregular with about 3 incipient cilia to either side below. *Staminodes* none. *Filaments* five, becoming 1,2 mm long, acicular, glabrous, spreading after anthesis. *Anthers* five, 0,8 mm long, 0,7 mm broad, yellowish; apical gland globose, semi-immersed. *Pollen* 45 μ long, 25 μ broad, oblong. *Disc* 5-sinuate-crenulate, green or reddened, stands well open, exceeds the ovary by a long way, exudes nectar. *Stigma* 0,35 mm diam., capitellate, pale green. *Style* becoming 1,2 mm long, normally fairly erect, glabrous. *Ovary* 5-carpellate, 7,5–12,5 mm long including the horn 1,5–3 mm long (observed from 17 localities), carpels glabrous, gland-dotted, oily and strong smelling when fresh if crushed. It appears that one, two or more of the carpels fail to be fertile. *Seed* 5,5–7 mm long, 2,4–3 mm broad (observed from 10 localities), black, shining; aril streaked with black.

Diosma hirsuta was amongst the earliest of Cape plants to receive recognition in Europe. Claudius' drawing, or what may be a copy of the original, done at the Cape sometime between 1682 and 1687 is to be found in what is believed to be the "Codex Witsenius" now preserved in the Africana Museum at Johannesburg. A note, written on the drawing translated reads: "African Hypericum, a scented shrub with white flowers, called Buchu by the Hottentots. Those that have been collected are dried and made into a nice smelling powder which is used to sprinkle on the head and clothes. It grows plentifully on the slopes of the mountain, is two feet high and flowers in September". The drawing depicts a typical plant of *D. hirsuta* as it occurs in its natural state, even going so far as to clearly show the persistent rootstock from which the plant may regenerate after fires.

Probably the first published illustration of *D. hirsuta* appeared in

Plukenet's *Almagestum Botanicum* t. 347, fig. 7 (1696). The original specimen from which the drawing was made is preserved in the Sloane Herbarium Vol. 102, fol. 179 at the British Museum (Nat. Hist.). It is a small flowering twig 110 mm long.

The original water colour drawing, from which the engraving of the plate *Spiraea Africana odorata foliis pilosis* Fig. 3 in Commelin's *Hort. Med. Amst.* (1706) was made, is preserved in the library of the Hortus Botanicus at Amsterdam. Although Linnaeus cites this illustration with his original description of *D. hirsuta* in the *Hortus Cliffortianus* (1737) this cannot be regarded as the type because he was already in possession of living material growing in the gardens of George Clifford at Hartecamp in Holland. The holotype is therefore the specimen beautifully mounted as though growing in an urn and preserved in the Clifford Herbarium at the British Museum (Nat. Hist.) with an isotype at the Linnaean Herbarium in London. These somewhat etiolated specimens have the appearance of plants grown under unnatural conditions and it is also quite possible that the pubescence noticed by Linnaeus was due to the same cause, it being very unusual to find such hirsute specimens in the wild.

The fact that *D. hirsuta* had been in cultivation in many gardens in Europe, that it is a somewhat variable species and that cultivated plants differ somewhat in appearance from those grown in the wild, led to a proliferation in the nomenclature with the result that no less than fourteen different specific names had been proposed by the year 1884. The above description, prepared from fresh material collected from the north slopes of the Sentinel at Hout Bay *(Williams 1856)*, might be considered as typical. Such variation as has been noticed is subsequently mentioned.

SPECIMENS EXAMINED

Note: Specimens in the following herbaria have been examined and identified: B, BM, BOL, C, G, GRA, GOET, K, LD, LINN, NBG, P, PRE, S, SAM, UPS, W. They are far too numerous to be listed and so there follows a selection of collections in order to provide a record of the distribution of the species. Only one specimen is cited from each quarter degree square in which the species has so far been located and only the specimens here listed have been shown on the distribution map.

CAPE—3218 (Clanwilliam): hills N.W. of Moutonsvlei, Piquetberg Division (-DC), 6/11/1934, *Pillans 7327* (BOL).
—3219 (Wupperthal): Cedarbergen, Pakhuis/Heuningvlei, Clanwillian. Division (-AA), 3 000 ft., 19/10/1953, *Esterhuysen 12057* (BOL); valley between Su[illegible]berg and Vensterberg near Algeria, Clanwilliam Division (-AC), –/12/1939, *Esterhuysen 2502* (BOL, PRE); Dasklip Pass, Cardouw Mtns, Piquetberg Division (-CC), 2 000–2 600 ft., 6/10/1971, *Williams 1550* (NBG, STE).

—3318 (Cape Town): near Yzerfontein, Malmesbury Division (-AD), –/7/1938, *Esterhuysen 2775* (BOL); in clivis montis Tabularis supra Orange Kloof, Cape Division (-CD), c. 2 000 ft., 21/2/1892, *Schlechter 363* (BM, GRA); Pella near Mamre, Malmesbury Division (-DA), 9/6/1969, *Axelson 23* (NBG); Achter Paarl, Paarl Division (-DB), 21/8/1938, *Barker 356* (NBG); Hazendal, Kuils River, Cape Division (-DC), 14/8/1961, *Rycroft 2299* (NBG); Bottelary Road, Stellenbosch Division (-DD), 350 ft., 9/12/1975, *Williams 2195* (NBG).

—3319 (Worcester): Boboskloof, Ceres Division (-AA), 1 020 m, 22/11/1975, *Williams 2150* (NBG); Schurfdeberg Pass, Ceres Division (-AB), 30/10/1950, *Compton 22273* (NBG); Mtns. above Tulbagh Waterfall, Tulbagh Division (-AC), 16/9/1928, *Hutchinson 408* (BOL, K, PRE); N. of Prince Alfreds Hamlet, Ceres Division (-AD), 1 750 ft., 23/10/1974, *Williams 2117* (NBG); in convalle Hex River prope De Doorns, Worcester Division (-BC), 1 700 ft., –/4/1907, *H. Bolus s.n.* (PRE); Bainskloof Mts. near Sebastiaanskloof, Paarl Division (-CA), 25/5/1940, *Esterhuysen 1976* (BOL); Brandvalleiberg, Worcester Division (-CB), –/6/1940, *Esterhuysen 1984* (BOL); Klein Drakenstein Mtns. upper Kasteelskloof, Paarl Division (-CC), 2 200 ft., 12/11/1970, *Haynes 449* (PRE, STE); Silverstream, Donkerhoek Mtns., Caledon Division (-CD), 3 000 ft., 23/11/1974, *Williams 1936* (NBG); in clivis montis Hex River Valley, Worcester Division (-DA), 1 700 ft., –/10/1881, *Tyson 674* (PRE); Dassieshoek, Langebergen, Robertson Division (-DB), 3/9/1961, *Esterhuysen 29118* (NBG); McGregor, Robertson Division (-DD), 24/9/1941, *Walgate 352* (NBG).

—3418 (Simonstown): Hout Bay, N. slopes of the Sentinel, Cape Division (-AB), 500 ft., 28/8/1973, *Williams 1856* (NBG, PRE, STE); Cape Point area, Cape Division (-AD), 29/11/1939, *Walgate s.n.* (NBG); Cape Flats, 2 miles W. of Faure, Stellenbosch Division (-BA), 19/1/1934, *Salter 4248* (BM, BOL); Somerset West, Stellenbosch Division (-BB), 22/8/1942, *Parker 3711* (NBG, PRE); Rooi Els on sandy banks, Caledon Division (-BD), 15/5/1947, *Parker 4187* (NBG).

—3419 (Caledon): Viljoens Pass, Caledon Division (-AA), 2 000 ft., 26/8/1940, *Compton 9208* (NBG); Zwartberg, Caledon Division (-AB), 2 000 ft., 16/10/1894, *Schlechter 5538* (PRE); Honigklip, Bot River/Kleinmond, Caledon Division (-AC), 19/11/1955, *Taylor 4850* (NBG, STE); Vogelgat Nature Reserve, near Hermanus, Caledon Division (-AD), 200 ft., 3/9/1976, *Williams 2198* (NBG); Snyerskraal, hills S. of Genadendal, Caledon Division (-BA), 900 ft., 6/10/1977, *Williams 2364* (NBG); Riviersonderend Mtns. foothills near Bokrivier farm, Caledon Division (-BB), 800 ft., 13/4/1974, *Williams 1895* (NBG); Sondagskloof Pass summit, Bredasdorp/Caledon Divisions (-BC), 900 ft., 26/7/1962, *Taylor 3617* (PRE, STE); Napier, on farm Eenheid, Bredasdorp Division (-BD), *Jordaan 64* (STE); Strandskloof, Bredasdorp Division (-CB), 100 ft., 9/9/1976, *Williams 2200* (NBG); Groenkloof on Rd. to Pearly Beach, Bredasdorp Division (-DA), 250 ft., 17/10/1976, *Williams 2115* (NBG); Boskloof, S. side of Bredasdorp Mtns., Bredasdorp Division (-DB), 750 ft., 24/2/1977, *Williams 2278* (NBG).

—3320 (Montagu): Cogmanskloof, Langebergen, Montagu Division (-CC), 8/10/1922, *Tredgold 430* (PRE); Strawberry Hill, Langeberg, Heidelberg Division (-DD), –/12/1954, *Stokoe s.n.* (SAM *68917*).

—3420 (Bredasdorp): Marloth Reserve, Swellendam Division (-AB), 900 ft., 28/10/1971, *Williams 1565* (NBG); Elandspad Farm, S. Potteberg, Swellendam Division (-BC), 900 ft., 12/4/1972, *Williams 1643* (NBG); Potteberg Estates near Cape Infanta, Swellendam Division (-BD), 500 ft., 16/6/1974, *Bayliss 6584* (NBG); Bredasdorp Poort, S. side, Bredasdorp Division (-CA), 150 ft., 11/1/1972, *Williams 1619* (NBG); near Struisbaai, Bredasdorp Division (-CC), 26/10/1940, *Esterhuysen 4859* (BOL).

—3321 (Ladismith): Garcias Pass, N. side, Riversdale Division (-CC), 1 900 ft., 23/12/1971, *Williams 1612* (NBG, PRE, STE).

—3421 (Riversdale): Verkykerskop, Corrente River Road, Riversdale Division (-AA), 1 050 ft., 27/12/1977, *Williams 2424* (NBG).
—3323 (Willowmore): Formosa Peak, Uniondale Division (-DC), 30/1/1941, *Esterhuysen 4652* (BOL); Joubertina, Uniondale Division (-DD), 24/1/1941, *Esterhuysen 6893* (BOL).
—3324 (Steytlerville): Assegaaibos, foot of road to Zuuranys, Humansdorp Division (-CD), 700 ft., –/11/1941, *Fourcade 5474* (NBG).
—3424 (Humansdorp): Hofmansbosch, Humansdorp Division (-AB), 5/1/1919, *Britten 1124* (PRE, GRA); Kruisfontein, Humansdorp Division (-BA), 11/9/1897, *Galpin 3853* (PRE, GRA).

DISTRIBUTION

Diosma hirsuta does not form dense stands, the plants being usually found to be somewhat dispersed in the fynbos. They occur mostly in the south western Cape extending as far north as the Pakhuis Pass near Clanwilliam and eastwards to Garcias Pass near Riversdale with outliers a further 240 km to the east from the vicinity of Joubertina to near Humansdorp. They grow at altitudes of from 90 to 900 metres above sea level in quartzitic soil derived from the Table Mountain geological series in stony gravelly ground but seldom in deep sandy soil.

VARIATION AND HYBRIDISATION

From the mass of material filed in the past under *Diosma vulgaris* in numerous herbaria it has been found possible to extract specimens representing as distinct species *Diosma acmaeophylla* Eckl. & Zeyh., *Diosma aspalathoides* Lam., *Diosma parvula* Williams, *Diosma pedicellata* Williams and *Diosma subulata* Wendland.

However, material that remains represents a decidedly variable species. Esterhuysen (1950), with reference to the populations of *Diosma hirsuta* L. found on the Cape Peninsula, remarked upon the degree of variation and noted the fact that the forms merge into one another and that no varieties could be upheld. Although all plants have a persistent root that may withstand occasional fires they vary in other respects as follows.

They may have few stems (1) or very many stems (2). Branchlets may be in varying degree crisped pubescent (3), puberulous (4) or glabrous (5). Leaves may vary in length from about 9.5 mm (6) to 41 mm (7), from being villous ciliate (8) to eciliate (9), from straight (10) to recurved (11) and from being fairly sparse (12) to closely packed (13). Shrubs may vary from bearing fairly few flowers (14) to being densely floriferous (15) and the flowers may have the calyx reddened (16) or green (17).

The following voucher specimens relating to the foregoing numbered variations are preserved at the Compton Herbarium (NBG): (1) Zeekoegat, Heidelberg Division, *Williams 2619*. (2) Zoekoegat, Heidelberg Division,

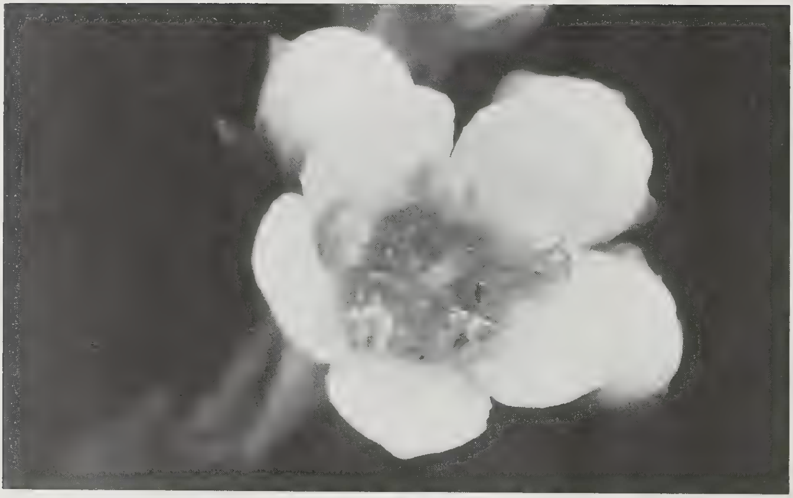

FIG. 10.
Flower of *Diosma hirsuta* with style deflexed.

Williams 2618. (3) Blue Downs near Blackheath, *Williams 2158*. (4) Vogelgat near Hermanus, *Williams 2198*. (5) Olifantskloof near Riviersonderend, *Williams 2500*. (6) Fernkloof, Hermanus, *Williams 1534*. (7) Bokrivier, Riviersonderend, *Williams 1895*. (8) The Sentinel, Hout Bay, *Williams 2242*. (9) Olifantskloof near Riviersonderend, *Williams 2500*. (10) Prince Alfreds Hamlet, Ceres Division, *Williams 2117*. (11) Toekoms, south side Bredasdorp Mountains, *Williams 2277*. (12) Modderasrivier, west of Genadendal, *Williams 2231*. (13) Gansbaai/Strandskloof, Caledon Division, *Williams 2205*. (14) Diepgat/Ertjiesvlei, Caledon Division, *Williams 2347*; (15) Diepgat, Caledon Division, *Williams 2213*. (16) Fernkloof, Hermanus, *Williams 1534*. (17) Fernkloof, Hermanus, *Williams 1535*.

These variations cannot be correlated with any environmental factor. Differing forms have been quite frequently found growing in localities quite close to one another. It may be significant that plants with somewhat recurved leaves have been found growing on soils with a gravelly subsoil.

Hybrids are extremely rare but one putative hybrid with *Diosma oppositifolia* L. has been collected by Esterhuysen near Steenbras Siding together with the putative parents.

CAPE—3418 (Simonstown): Steenbras Siding, Caledon Division (-BB), –/7/1940, *Esterhuysen 2685* (BOL) = *D. hirsuta* X *D. oppositifolia*, *Esterhuysen 2690* (BOL) = *D. hirsuta*, *Esterhuysen 2686* (BOL) = *D. oppositifolia*.

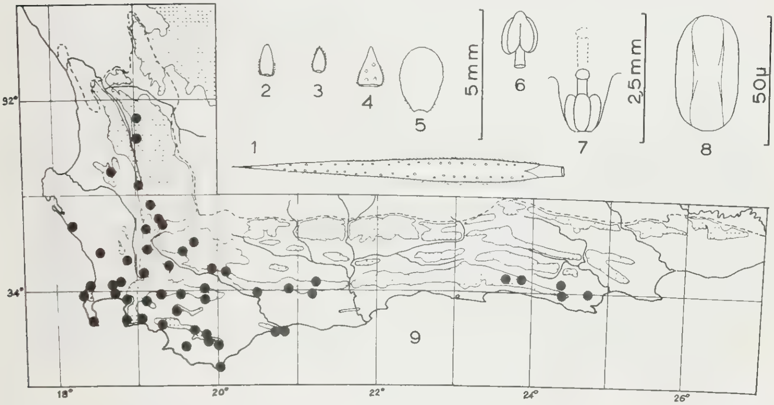

FIG. 11.
Diosma hirsuta from The Sentinel, Hout Bay (*Williams 1856*): 1, leaf. 2, bract. 3, bracteole. 4, calyx lobe. 5, petal. 6, anther. 7, gynoecium. 8, pollen. 9, distribution showing only one locality where collected in each quarter degree square.

Diosma hirsuta is recognised as a distinct species being a fairly low shrub with several stems arising from a persistent underground rootstock; with leaves alternate, petiolate, linear-lanceolate, acute with a sharp straight point, having the midrib often flattened when dry; with flowers fairly numerous in very much reduced racemes, the petals ovate, glabrous, spreading, persisting for a long time, the disc standing open sinuate-crenulate without staminodes. It differs from *D. acmaeophylla* Eckl. & Zeyh. and *D. fallax* Williams which have leaves sessile; from *D. aspalathoides* Lam. which has petals much larger and the apex of the leaf abruptly recurved; from *D. parvula* Williams which is much smaller in all floral parts with the petals retuse and from *D. pedicellata* Williams with fruits pedicellate above the calyx, petals soon delapsing and with the leaf with a rounded or narrow midrib when dry.

7. Diosma parvula Williams, sp.nov. propria propter fruticem glabrum ad basim monocaulem ramulis filiformibus, foliis eciliatis, floribus pedicellatis 2,5 mm diam. petalis retusis, fructis parvulis.

Frutex c. 0,4 m, laxiusculus, ad basim monocaulis. *Rami* graciles, erectiusculi, pauci, glabri sparsim glanduloso-punctati. *Ramuli* filiformes, erecti, pauci. *Folia* 9, 5-13 mm longa, 0,8-0,9 mm lata, linear-lanceolata, acuta, pungento-mucronata, breve petiolata, glanduloso-punctata, glabra, [illegible] alterna; marginibus anguste hyalinis. *Inflorescentia* terminalia, reducto racemosa, c. 12-florifera: *flos* c. 2,5 mm diam., cyanthiformis, pedicellatus.

Bractea 0,5-1,5 mm longa, 0,3 mm lata, ovato-lanceolata, sparsim ciliolata. *Bracteolae* duae, ad basim pedicelli, 0,25-0,5 mm longae, 0,2 mm latae, ovato-lanceolatae, ciliolatae, pallidae, sparsim pubescentes. *Sepala* quinque, 0,5 mm longa, 0,6 mm lata, semi-elliptica, obtusa, glabra, sparsim ciliolata, in medio incrassata. *Petala* quinque, 1,3 mm longa, 1,3 mm lata, obovata, obtuso-retusa, glabra, alba, sessilia, persistentia. *Staminodia* 0. *Filia* quinque, 1 mm longa, glabra. *Antherae* quinque, ante anthesin 0,5 mm longae, 0,5 mm latae, vinosae, glabrae, glandula semi-immersa coronata. *Pollen* 41 μ longum, 21 μ latum, oblongum. *Discus* sinuato-crenulatus, patens, multipunctatus, nectarifer. *Stigma* 0,2 mm diam., capitellatum, globosum. *Stylus* 0,5 mm longus, glaber, erectus, deum cadens. *Ovarium* 5-carpellatum, 0,5 mm diam., glabrum, apicibus globosis. *Fructus* 5-carpellatus, 5,8 mm longus in toto, 5 mm diam., glaber, nitens, viridus, glanduloso-punctatus; cornua c. 1 mm longa, apicibus atroviridis, patentibus. *Semen* 3,8 mm longum, 2 mm latum, piceum, nitens; arillus nigrifasciatus.

Type: CAPE—3420 (Bredasdorp): south side of Potberg, 1,5 km W.N.W. of Buffelsfontein, Bredasdorp Division (-BC), 135 m alt., 8/4/1981, *Williams 3126* (NBG, holotype; BOL, K, MO, PRE, S, STE, isotypes).

Shrubs about 0,4 m tall, rather lax, single-stemmed at base. *Branches* fairly erect, not numerous, slender, glabrous, smooth, sparsely gland-dotted, somewhat reddened. *Branchlets* erect, not numerous, filiform, straight, pale green at first, not hidden by the leaves. *Leaves* 9,5–13 mm long including the petiole about 1 mm long, up to 21,5 mm long in young plants, 0,8–0,9 mm broad, up to 1,2 mm broad in the largest leaves, acute with a straight sharp mucro, glabrous, alternate, spreading-erect; margins eciliate very narrowly translucent; adaxial surface flat; abaxial surface rounded, gland-dotted. *Inflorescence* terminal in much reduced racemes with about a dozen flowers opening from the apex downwards; *flowers* about 2,5 mm diam., white, cup-shaped, pedicellate. *Bract* at the base of the pedicel, 0,5–1,5 mm long, 0,3 mm broad, ovate-lanceolate, sparsely ciliolate. *Bracteoles* two, at the base of the pedicel, 0,25–0,5 mm long, 0,2 mm broad, ovate-lanceolate, ciliolate, sparsely pubescent on both sides, pallid. *Calyx lobes* five, 0,5 mm long, 0,6 mm broad, semi-elliptic, obtuse, glabrous, sparsely and minutely ciliolate, thickened in the middle above. *Petals* five, 1,3 mm long, 1,3 mm broad, obovate, retuse, glabrous, white, sessile, thinner at the margins, fairly erect, arising below the margin of the disc, persisting for a long time. *Staminodes* absent. *Filaments* five, becoming 1 mm long, acicular, glabrous, erect in line with the petals. *Anthers* five, before anthesis 0,5 mm long, 0,5 mm broad, glabrous, wine-coloured; apical gland paler, semi-immersed. *Pollen* 41 μ long, 21 μ broad, oblong. *Disc* sinuate-crenulate, stands open, more or less equals the ovary, may become bright red, exudes nectar from *numerous* pits on its surface. *Stigma* 0,2 mm diam., globose, capitellate. *Style* becoming 0,5 mm long, glabrous, erect, eventually delapsing. *Ovary* 5-carpellate, 0,5 mm diam., glabrous, apices globose. *Fruit* 5-carpellate, all five seldom if ever developing a seed, 5,8 mm long overall, 5 mm diam., glabrous, shining, green, gland-pitted; *horns* about 1 mm long, dark green tipped, set at 45°. *Seed* 3,8 mm long, 2 mm broad, black, shining; aril streaked with black.

This rare species appears to have been first collected by C. A. Smith in 1927 near Bredasdorp, a town with which, being an Albertyn, he was closely associated. It was the discovery of a small population near the Potberg in 1980 by C. J. Burgers that enabled the author to obtain the fresh material used in the preparation of this description.

SPECIMENS EXAMINED

CAPE—3419 (Caledon): Grashoek, Bredasdorp Mountain (-DB), 6/12/1938, *Eric Wall s.n.* (S); flats between Bredasdorp and Elim, 5/8/1940, *Compton 9087* (NBG), *Esterhuysen 3099* (BOL, NBG).

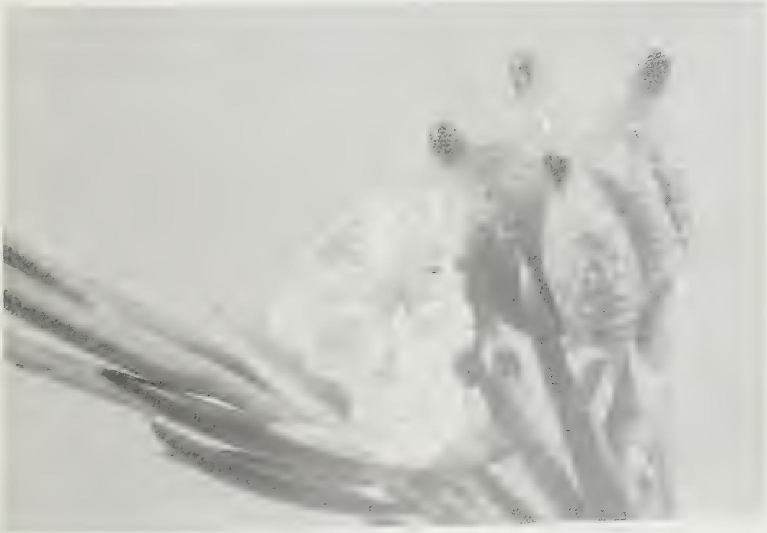

FIG. 12.
Diosma parvula: flowers and fruit (photograph by C. Burgers).

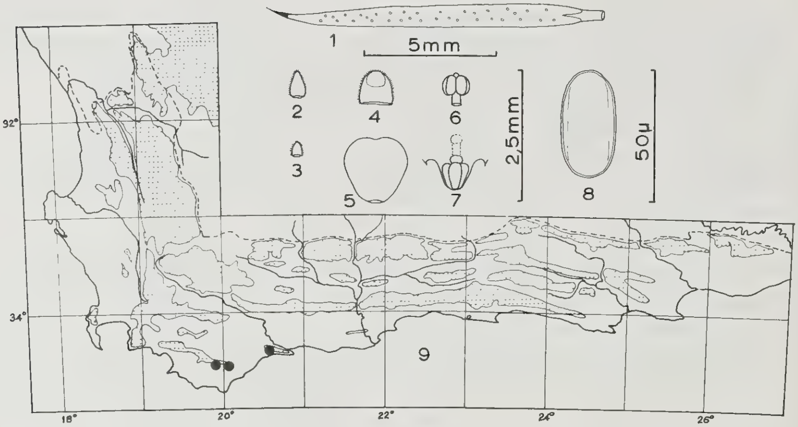

FIG. 13.
Diosma parvula: 1, leaf. 2, bract. 3, bracteole. 4, calyx lobe. 5, petal. 6, anther. 7, gynoecium. 8, pollen. 9, distribution.

—3420 (Bredasdorp): south side of Potberg, 1,5 km W.N.W. of Buffelsfontein, Bredasdorp Division (-BC), 135 m alt., 20/8/1980, *Burgers 2478* (CPA Nat. Cons. Herb.), 8/4/1981, *Williams 3126* (NBG, BOL, K, MO, PRE, S, STE); Driefontein, Bredasdorp (-CA), 200 ft. –/6/1927, *Smith 4301* (K, PRE); hills with an easterly aspect near Bredasdorp, –/4/1933, *L. Bolus s.n.* (BOL *20530*, K).

DISTRIBUTION

Diosma parvula is apparently only found on the flats between Elim and Bredasdorp and again on the plain south of Potberg. The locality "Driefontein" given by Smith, close to Bredasdorp, is now overrun with wattles and so degraded that the species is unlikely to be still surviving in that area. It is very vulnerable to alien encroachment, occurring as it does in dark sandy soil near seepage areas associated with *Berzelia lanuginosa*. It has now been collected on the Elim flats near Jacobsdam, 20/10/1981, *Bean 737* (BOL) where the plants were found to be 1,5 m tall.

DISCUSSION

Diosma parvula is recognised as distinct being a glabrous shrub, regenerating only from seed after fires; with very slender branchlets, eciliate leaves; flowers 2,5 mm in diam., pedicellate with petals retuse and having a very small fruit. It is most like *Diosma hirsuta* which however coppices after fires, has flowers 4–5 mm in diameter and much larger fruits.

8. Diosma fallax Williams, nom. nov., vice *Diosma eckloniana* Sond. in Flor. Cap. **1**: 375 (1860). Type: 89.9, *Ecklon No. 455* (S, holotype).

Name invalidated by *Diosma eckloniana* (Schldl.) D.Dietr., Synops. Plant. **1**: 826 (1839) which is a species of *Agathosma*.

A *shrub* more than 300 mm tall, apparently quite dense, prickly and twiggy rather than lax, habit unusual in that the leafy branchlets are scattered about and not concentrated towards the top of the shrub. *Branches* numerous, short, not straight, glabrous with a smooth brown bark. *Branchlets* very numerous, short, slender, alternate, spreading, with a shining smooth bark, not hidden by the leaves. *Leaves* to 14 mm long, 1 mm broad, linear, acute, with a long sharp needle-like point, glabrous, sessile, alternate, more or less spreading; margins very entire, narrowly translucent; abaxial surface convex without any keel with gland dots more or less in two rows; adaxial surface concave. *Inflorescence* terminal with *flowers* few, crowded together in very much reduced racemes on glabrous pedicels. *Bract* glabrous, a very much reduced leaf with a sharp point. *Bracteoles* two, lanceolate, acute, glabrous, eciliate, all 3 at the base of the pedicel. *Calyx lobes* five, 1 mm long, ovate-lanceolate, apiculate, glabrous, eciliate, gland-dotted; margins broad, translucent. *Petals* five, ovate, glabrous, 1–2 gland-dotted, spreading, persisting. *Staminodes* absent. *Filaments* five, 1,5 mm long, glabrous. *Anthers* five, with a globose apical gland. *Disc* 5-lobed, sinuate, stands open around the ovary. *Stigma* capitellate. *Style* glabrous. *Unripe fruit* 6 mm long, glabrous; *horn* 3 mm long with an immersed apical gland.

The type material now housed in the herbarium of the Natural History Museum at Stockholm consists of two twigs mounted on a single sheet. There are flowers and one immature fruit. The left hand specimen is 320 mm long with two labels "No. 455. 89.9" and "No. 455. *Diosma eckloniana Sr.* Diosma probabiliter species nova.". The inscription *Diosma Eckloniana Sr.* is almost certainly in Sonder's handwriting. The right hand specimen is 220 mm long and is labelled "D. eckloniana" in Sonder's hand. There is a capsule but no notes by Sonder. As this is the only specimen of this species that I have seen in any herbarium so far examined and as I consider it to have been seen by Sonder in the preparation of his description of his *Diosma eckloniana*, I have labelled it as the holotype.

According to Drège in Linnaea **19**: 589 (1847) the locality indicated by 89.9 is "Swellendam, dry mountain ridge near the Riviersonderend, at Stormsvlei, Hassaquaskloof etc. as far as the Breederivier, 500–2 000 ft., September". Repeated searching of these mountains has as yet failed to produce this species.

A detailed examination of this type material has assisted in the preparation of the above amplified description of this species.

Diosma fallax is recognised as distinct being a shrub with a ragged habit, entirely glabrous and eciliate; with leaves round backed linear, sessile, alternate, with a long sharp needle-like point; and with petals glabrous, 1–2 gland-dotted.

9. Diosma subulata Wendl., Coll. Plant. **1**. t. 8 (1805). Iconotype: *Diosma subulata* Wendl. loc. cit. (BM, C, isotypes).

Diosma vulgaris Schldl. var. α Sond. in Flor. Cap. **1**: 374 (1860)) ex parte. as to syn. *D. subulata* Wendl.

Diosma vulgaris Schldl. var. β Sond. loc. cit. Type: *D. oppositifolia E. & Z. 837* ex parte.

Diosma oppositifolia Bartl. & Wendl. Diosm. in Beitr. Bot. **1**: 31 (1824) ex parte.

Diosma pectinatum Wendl. Enum. Plant.: 258 (1809) ex parte as to *D. pectinata 4*. (B-W *4790*).

Icones: *Diosma foliis linearibus glabris acutis*. Mill. Fig. Plant. Pl. 124, fig. 1 (1760). *Diosma subulata*. Wendl. Coll. Plant. **1**. t. 8 (1805).

Shrubs up to 1,8 m tall, erect, single-stemmed at base with a dense crown of flowering heads. *Branches* erect, sometimes dichotomous, variously angled, glabrescent; bark smooth when green with horizontal leaf scars. *Branchlets* erect, short, crisped-puberulous, pinkish in colour, well clothed with leaves. *Leaves* vary in size being largest on young vigorous shoots and smallest towards the tips of the branchlets of the older shrubs, up to 17 mm long, 2,9 mm broad, average 11 mm long, 2 mm broad, linear-lanceolate (almost awl-shaped), acute with a straight sharp point, somewhat complicate when dry, glabrous, scabrous, erect, straight or sub-falcate, mostly opposite except in vigorous young shoots, the largest leaves may have a few hairs in the hollow towards the base; midrib prominent with about two rows of gland dots to either side; hyaline margins narrow, serrulate and ciliate becoming eciliate; petiole 1 mm long. *Inflorescence* terminal, solitary in very much reduced racemes; *flowers* c. 6 mm diam., petals white. *Bract* one, 4 mm long, 1,2 mm broad, leaf-like, lanceolate, mucronate, glabrous, ciliolate below, sessile, inflexed. *Bracteoles* two at the base of the pedicel, 1,8 mm long, 0,6 mm broad, lanceolate, glabrous, ciliolate, pallid, assymmetrical. *Calyx lobes* five, 2,3 mm long, 1,8 mm broad, deltoid, acute, mucronulate, glabrous, ciliolate, pinkish. *Petals* five, 2,5 mm long, 1,6 mm broad, ovate, glabrous, sparsely ciliolate below, sessile. *Staminodes* none. *Filaments* five, becoming reflexed and 2 mm long, acicular, glabrous. *Anthers* five, before anthesis 0,7 mm long, 0,7 mm broad, reddish-orange; apical gland minute. *Pollen* 60 μ long, 27 μ broad, obloid, very slightly narrowed in the middle. *Disc* 5-sinuate-crenulate, fleshy, exceeds the ovary by a long way, exudes nectar. *Stigma* 0,2 mm diam., capitellate, green. *Style* seldom deflexed at first, becoming 1,3 mm long, glabrous. *Ovary* 5-carpellate, 0,7 mm diam., glabrous. *Fruit* 5-carpellate, 10 mm long overall, glabrous, multi-gland-dotted; *horns* 2 mm long, apex somewhat bifid. *Seed* 5,5 mm long, 5,7 including the aril, 2,6 mm broad, black, shining; aril black and white.

Diosma subulata was apparently raised from seed in the Physic Garden at Chelsea some years before 1760 when it was figured by Miller in his *Gardeners Dictionary*. Later on it was in cultivation in the Royal Gardens at Hanover and figured by Wendland in his "Collection of Plants". It is most extraordinary that no herbarium specimen collected at the Cape in those early days has been found and one has no idea where the plants occurred from which the seeds came for growing the plants in Europe. There is a time gap of more than 100 years before this species was collected and placed in an herbarium. Since then it has been collected only a few times, fairly close to the coast from Hawston to just beyond Danger Point, but nowhere near the Cape Peninsula. One wonders if it once grew on the Cape Flats and not having a strong underground rootstock was soon eliminated by mankind. The above description prepared from fresh material amplifies those previously given.

SPECIMENS EXAMINED

CAPE—3419 (Caledon): Middelvlei Reserve, Hawston, reclaimed drift sand, Caledon Division (-AC), 8/9/1932, *Hubbard 221* (STE); Die Duine, Wortelgat near

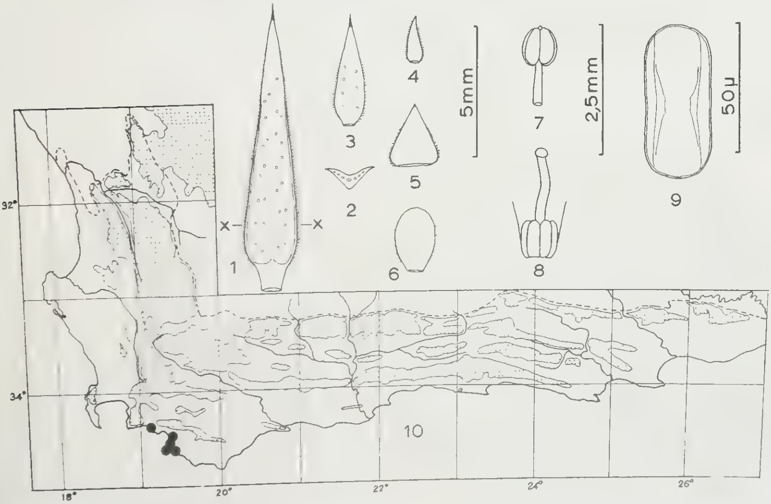

FIG. 14.
Diosma subulata: 1, leaf. 2, cross-section of leaf. 3, bract. 4, bracteole. 5, calyx lobe. 6, petal. 7, anther. 8, gynoecium. 9, pollen. 10, distribution.

Hermanus, Caledon Division (-AD), 100 ft., 4/4/1972, *Williams 1635* (NBG, PRE, S, STE), 200 ft., 7/11/1972, *Williams 1721* (NBG), 100 ft., 22/6/1977, *Williams 2311* (NBG); Between Hermanus and Die Kelders near Dadelkom, 1 km from sea, 150 ft., 26/3/1973, *Williams 1776* (NBG, PRE, STE); The Downs, Wolwefontein between Hermanus and Die Kelders, 200 ft., 4/6/1973, *Williams 1815* (NBG, PRE, S); Die Kelders, Caledon Division (-CB), 0–100 ft., 9/11/1962, *Taylor 4290* (PRE, STE); Stanfords Cove/Die Kelders, 50 ft., 20/7/1974, *Williams 1910* (NBG, PRE); Danger Point, –/6/1950, *Lewis 3370* (SAM), 10/6/1950, *B. Maguire 18 and 19* (NBG); near Frikkiesbaai, 24/8/1946, *Leighton 1906* (BOL); 3,8 km E. of bridge over Uilenkraals River on the road to Pearly Beach, Bredasdorp Division (-CB), 100 ft., 3/8/1975, *Williams 2031* (NBG).

Cultivated specimens: (B-W *4790/4), Hort. Wendland* (BM, C), –/–/1778, *Chelsea Physic Garden 2812* (BM), –/–/1783, *Hort. Paris* (BM), –/–/1786, *Hort, Chapel Allerton* (BM), (LD *108*), (LD-ACHAR *100*), (W *272, 238*).

DISTRIBUTION AND VARIATION

Diosma subulata has only been recorded from the coastal strip from near Hawston to just beyond the Uilenkraals River. It is never more than about 2,5 km from the sea and grows in sandy soil near stabilised sand dunes. No appreciable variation has been noted but a series of very similar species occur further to the east also growing in sandy soil. They are *D. awilana, D. arenicola* and *D. sabulosa*.

Diosma subulata is recognised as distinct being a shrub up to 1,5 mm tall, single-stemmed at base with leaves subulate, sub-complicate, incurved-erect, ciliate, petiolate; flowers crowded together in reduced racemes; calyx lobes acute and petals glabrous. It differs from *D. awilana* which has leaves sessile and with the mucro sharply reflexed; from *D. arenicola* which has bracts, bracteoles and calyx lobes long crisped-ciliate and from *D. sabulosa* which has leaves ovate.

10. Diosma awilana Williams in Jl S. Afr. Bot. **41**. 4: 255 (1975). Type: CAPE—3419 (Caledon): at base of limestone hills, Awila south of Baardscheerdersbosch, Bredasdorp Division (-DA), 61 m (200 ft.), 25/5/1973, *Williams 1803* (NBG, holotype; PRE, STE, MO, K, isotypes).

Diosma awilana is recognised as distinct on account of its having leaves alternate, sessile, broadly lanceolate with the mucro sharply reflexed and margins crisped ciliate; without any staminodes and with the ovary glabrous. It differs from *D. subulata* which has leaves that are frequently opposite, petiolate and falcate with a straight point. It differs also from *D. sabulosa*, which occurs much further to the east, which has smaller leaves with less hairy margins, with a smaller point at the apex and with smaller flowers. It differs from *D. arenicola* which has leaves less broad and less recurved at the apex, bracteoles much more hairy and twice as long and fruits with much shorter horns.

11. Diosma arenicola Williams in Jl S. Afr. Bot. **45**. 2: 169 (1979). Type: CAPE—3419 (Caledon): Soetanysberg above the farm Hangnes, Bredasdorp Division (-DB), 180 m (600 ft.) alt., 25/5/1978, *Williams 2507* (NBG, holotype; BOL, K, MO, PRE, S, isotypes).

Diosma arenicola is a distinct species with leaves lanceolate with a straight sharp point, with margins crisped ciliate and with the midrib often sparsely pubescent; with bracteoles 4 mm long, linear, crisped ciliate and pubescent along the midrib; and with flowers crowded and sessile. It differs from *D. awilana* which has leaves much broader and more recurved at the apex, bracteoles much less hairy and only half as long and fruits with much longer horns. It also differs from *D. subulata* which is a much more glabrous plant with bracts, bracteoles and calyx lobes short-ciliate not long crisped-ciliate and with flowers in very much reduced racemes not crowded and sessile.

12. Diosma sabulosa Williams in Jl S. Afr. Bot. **41**.4: 258 (1975). Type: CAPE—3420 (Bredasdorp): Potberg, in deep sand at base of limestone hills between Buffelsfontein and Cupidoskraal, Bredasdorp Division (-BC), 137 m alt., 22/1/1975, *Williams 1955* (NBG, holotype; K, M, MO, PRE, S, STE, isotypes).

Diosma sabulosa is recognised as distinct on account of its being a tall plant arising from a single stem; with leaves ovate, alternate, sessile, gland-dotted towards the midrib with thin translucent margins, without staminodes and with petals and ovary glabrous. It differs from *D. echinulata*, from the neighbouring limestone, which is a small scabrous plant with leaves closely spaced, setose-pubescent with a sharp mucro, thick margins and a short petiole, with petals pubescent and with the ovary crowned with short setose hairs. It differs from *D. subulata, D. awilana* and *D. arenicola* which have leaves lanceolate or ovate-lanceolate and much longer.

13. Diosma pilosa Williams in Jl S. Afr. Bot. **41**.3: 173 (1975). Type: CAPE—3419 (Caledon): on a shoulder of the Riviersonderend mountains due south of Pilarkop near Koksrivier, Caledon Division (-BB), 460 m alt., 13/4/1974, *Williams 1892* (NBG, holotype; BOL, C, K, MO, M, PRE, S, STE, isotypes).

Diosma pilosa is recognised as a distinct species because it is single-stemmed at the base; has slender branches; adpressed leaves; petals with 2–7 long weak hairs, disc wine-coloured and fruits with very short horns. It is nearest in appearance to *D. meyeriana* but differs in having gland dots scattered on both sides of the midrib instead of one straight row of gland dots on either side of the midrib, flowers less numerous and much larger with petals bearing 2–7 long weak hairs, calyx lobes with much shorter horns spreading rather than erect.

14. Diosma oppositifolia L., Sp. Pl. **1**: 198 (1753), Esterhuysen in Jl S. Afr. Bot. **9**.3: 137 (1943), Williams in Jl S. Afr. Bot. **40**.4: 276 (1974). Iconotype: *Spiraea Africana foliis cruciatim positis.* Fig. 1. Comm. Hort. Med. Amst. (1706).

Diosma succulenta Berg., Descr. Plant. Cap.: 63 (1767) excl. syn. Pluk. Type: e Cap. b. sp. *Grubb s.n.* (S-BT).

Diosma scabra Lam., Encycl. Meth. Bot. **2:** 283 (1786). Type: labelled *Diosma scabra Lam. Dict.* (P-LA).

Diosma decussata Lam., Encycl. Meth. Bot. **2**: 284 (1786). Type: right hand specimen on sheet labeled *Diosma decussata Lam. Dict.* (P-LA).

Diosma succulenta Berg. var. *bergiana* Sond. in Flor. Cap. **1**: 373 (1860).

Diosma carnosa Solander mss. (BM)-nom. nud.

Diosma rigidula Willd., Enum. Plant. Hort. Berol. Suppl.: 12 (1813)-nom. nud.

Diosma acicularis Salisb., Prod. Chap. All.: 142 (1796) nom. superf. Type: As for *D. oppositifolia* L.

Diosma crassifolia Hoffmgg., Verz. Pflanz.: 57 (1826)-nom. nud.

Diosma tetragona Hort. ex Bartl. & Wendl. Diosmeae in Beitr. Bot. **1**: 26 (1824)-nom. nud.

Diosma succulenta Berg. *var.* β *arenaria* Eckl. & Zeyh. Enum. Plant.: 107 (1835)-nom. nud.

Diosma succulenta Berg. *var.* γ *alpina* Eckl. & Zeyh.: 107 (1835)-nom nud.

Icones: *Spiraea* . . . Comm., Hort. Med. Amst. t.l. (1706); *Diosma succulenta* Wendl., Coll. Plant, t.l. (1805); *Diosma oppositifolia* L. Kidd, Wild Flow. Cap. Pen. pl. 23, fig. 10 (1950); *Diosma oppositofolia* L. Mason, W. Cap. Sandv. Flow. pl, 60, fig. 1 (1972).

Shrubs 0,15–1 m tall, erect or sprawling with many stems arising from a stout persistent rootstock. *Branches* fairly slender, glabrous, dark brown, tough, devoid of leaves after about 2 years, tending to become decumbent. *Branchlets* erect, slender, numerous, sparsely puberulous, yellow, leafy. *Leaves* 5–10 mm long, longer in new shoots after fires, 1–1,3 mm broad, narrow-linear, lanceolate or often sub-falcate, glabrous, complicate when dry, opposite, spreading-erect, longer than the internodes, subulate, apex acute with a sharp point or obtuse with a callus, somewhat bent outwards; margins thin, narrowly cartilaginous, sparsely ciliolate; adaxial surface smooth, rather concave, channelled when dry; abaxial surface rounded, gland-dotted to either side, narrowed very slightly at the base; petiole about 0,5 mm long, adpressed. *Inflorescence* terminal with the sessile flowers arising in pairs or sub-terminal-axiliary with the *flowers* arising in opposite pairs etc up to eight flowers in a group. *Bract* one to each flower, varying considerably, 2–4,5 mm long, 0,7–1,3 mm broad, lanceolate, acute, ciliolate, gland-dotted, adaxially flat, round backed, sessile, spreading. *Bracteoles* two, 1,1–2 mm long, 0,5–0,7 mm broad, lanceolate, sub-acute, sessile, glabrous, minutely gland-dotted; margins minutely ciliolate, narrowly translucent. *Calyx lobes* five, 2,3–2,5 mm long, 1,3 mm broad, lanceolate, acute, glabrous; margins minutely ciliolate, narrowly translucent. *Petals* five, 2,9 mm long, 1,8 mm broad, oblong-elliptic, obtuse, sessile, glabrous, white, spreading; margins slightly irregular, partly ciliolate. *Staminodes* none. *Filaments* five, becoming 1,5 mm long, acicular, glabrous. *Anthers* five, before anthesis 1 mm long, 0,7 mm broad, yellow; apical gland globose, sessile, *Pollen* 52 μ long, 27 μ broad, oblong. *Disc* sinuate, not much crenulate, green, stands wide open, exceeds the ovary, exudes nectar. *Stigma* 0,25 mm diam., capitellate, green. *Style* deflexed at first becoming 1,2 mm long, erect, glabrous. *Ovary* 5-carpellate, 0,9 mm long, 1 mm diam., glabrous, apices globose, *Fruit* 5-carpellate, 10–12 mm long, 12 mm diam., glabrous, gland-dotted; *horns* truncate or up to 2 mm long, spreading. *Seed* 6,5 long, 3 mm broad, black, shining; aril black.

HISTORICAL NOTE

Occurring as it did in the vicinity of Cape Town *Diosma oppositifolia* was one of the earlier species to have been collected at the Cape. It is possible that it was first collected by Oldenland about the year 1692 as listed in Burman's *Prodromus Flora Capensis* published as an adddendum to his *Flora Zeylandica* in 1768. Thereafter more gatherings were made by the earlier botanical collectors notably Thunberg, Masson, Oldenburg, Banks & Solander, Roxburgh, Niven, Bowie, Sieber, Sonnerat, Ecklon & Zeyher and Drège. Burchell made no less than six well documented collections of this species. Solander gave it the rather apt manuscript name *Diosma carnosa*. The species depicted by Commelin (1706) was grown in the Amsterdam Medical Garden from seed obtained from the Cape of Good Hope and the original water colour from which the plate was engraved is preserved in the library of the Hortus Botanicus in Amsterdam. The above description prepared from fresh material amplifies those previously given.

SPECIMENS EXAMINED

CAPE—3318 (Cape Town): farm Zonquasfontein 12,5 miles from Darling (-AB), 24/6/1968, *Boucher 60* (PRE, STE); Springfontein, Malmesbury Division (-CB), 22/1/1971, *Axelson 383* (NBG); Mamre, –/9/1939, *Walgate s.n.* (BOL); on road to Springfontein Strand near Mamre, 600 ft., 11/8/1977, *Williams 2331* (NBG); road to Pella, near Mamre, 700 ft., 25/1/1977, *Williams 2267* (NBG); Mamre R[illegible] (-BC), 4/8/1946, *Leighton s.n.* (BOL); Riverlands, Malmesbury Division (-BC/D[illegible]), 21/9/1977, *Esterhuysen 34649* (BOL); in dunis arenosis pone Rondebosch prope Cape Town infra 100 ped. (-CD), –/6/1879, *H. Bolus 1393* (BM); in clivis montis Tabula[illegible] supra Orange Kloof, 2 000 ft., 26/6 1892, *Schlechter 1034* (BM, GRA, P, W); am Tafelberg, 2 000 ft., 30/4/1826, *Drège a* (G, K, P, S, W); Tafelberg, 2 000–3 000 ft., 13/5/1828, *Drège b* (G, P, S, W); Table Mt. lower W. slopes, –/5/1939, *Esterhuysen 22923* (BOL); Table Mt., Wood Buttress above Bakoven, lower slopes, –/5/1939, *Esterhuysen 22924* (BOL); N.E slopes of Table Mt., above High Level road, –/6/1940, *Esterhuysen 22921* (BOL); Table Mt., lower plateau, –/8/1938, *Esterhuysen 23079* (BOL); Table Mt., lower plateau, near the Wynberg Reservoir, –/5/1938, *Esterhuysen s.n.* (BOL); mountainsides above Kirstenbosch, 17/8/1928, *Hutchinson 40* (BOL); Kirstenbosch, lower slopes N. of Window Stream, 7/1/1951, *Esterhuysen 18293* (BOL); sandy slopes N. of Window Stream, 14/4/1956, *Esterhuysen 25639a* (BOL); Kenilworth Race Course, 13/2/1965, *Esterhuysen 30941* (BOL), 19/2/1970, *Esterhuysen 32391* (BOL); half a mile S. of Saxonwold turnoff on Mamre Road, Malmesbury Division (-DA), 400 ft., 17/1/1973, *Williams 1744* (NBG, PRE, STE); on road to Pella Mission near Mamre, 750 ft., 8/9/1975, *Williams 2066* (NBG); Brackenfel, Stellenbosch Division (-DC), 14/12/1940, *Esterhuysen 4058* (BOL, GRA, NBG, PRE), –/1/1956, *Loubser 666* (BOL); between Brackenfel and Kraaifontein, 28/11/1972, *Esterhuysen 33052* (BOL), 12/4/1977, *Burgers 421* (Nat. Cons. Herb.); near Mamre turnoff on National Road to Malmesbury, 237 ft., 28/8/1973, *Williams 1857* (NBG); Monte Vista, 20/19/1965, *Esterhuysen 31302* (BOL); In sabulosis (Altit. 1) Planitiei Capensis prope Doornhoofde, –/1/–, *Ecklon & Zeyher 839* β *arenaria* (C, G, PRE, S, SAM, W).

—3148 (Simonstown): in collibus circa Simonstown bay (-AB), –/10/1801, *Robert Brown s.n.* (BM); near Constantia, 1/1/1896, *Wolley Dod 728* (BM, BOL); sandy plains, Wynberg, *Niven 30* (BM); Claremont flats prope Wynberg, 22/1/1892, *Schlechter 229* (C, G, GRA, P, W); Kalk Bay Mt., 500 ft., –/12/1913, *F. Bolus s.n.* (BOL), 1 000 ft., 1/8/1976, *Goldblatt 3700* (MO); Inhoffs Gift, Cape Peninsula, –/8/1939, *Esterhuysen 22920* (BOL); Slangkop, –/7/1939, *Esterhuysen 22909* (BOL); in lapidosis summi montis Muizenberg, c. 1 000 ft., –/9/1882, *MacOwen* HNAA *205* (BOL); Hout Bay on the N. slopes of the Sentinel, 500 ft., 28/8/1973, *Williams 1855* (NBG); Hout Bay, slopes of Table Mt., below Groot Kop, 21/3/1942, *Esterhuysen 22922* (BOL), *Esterhuysen 23084* (BOL); S. end of Table Mt., slopes above Constantia Nek, 4/5/1952, *Esterhuysen 20097* (BOL); Bonteberg, Southern Peninsula, 12/8/1940, *Esterhuysen 22908* (BOL); near Smitswinkel, Cape Peninsula (-AD), 1 300 ft., 26/4/1940, *Compton 8710* (NBG); Cape Point Nature Reserve, Brightwaters, 25/2/1980, *Bean 353* (BOL), 21/1/1948, *Rodin 3298* (BOL); Zeekoevlei (-BA), –/7/1938, *Esterhuysen s.n.* (BOL); Steenbras River Mouth, rocky ground near the sea (-BB), 23/3/1946, *Parker 4039* (NBG); in terra ericeta (altit. IV, V) laterum montium Hottentotshollandberge, –/4/–, *Ecklon & Zeyher 839* γ *.alpina* (SAM); Kogelberg Reserve, S.W. slopes of the Paardeberg, Caledon Division (-BD), 600 ft., 7/1/1970, *Boucher 1023* (PRE, STE); Kogelbay, 15/12/1946, *Leighton 2470* (BOL).

—3419 (Caledon): Palmiet River, Caledon Division (-AA), 1 200 ft., 4/2/1896, *Schlechter 7324* (BM, G, GRA, S, W); on the mountain of the Niewekloof, 18/3/1815, *Burchell 8094* (K); in collibus Grabouw prope Palmiet River, –/12/1897, *H. Bolus 4119* (BOL); in lateribus montium Hotentotshollandberge prope fluvium Palmiet River, altit. III, (–/6/–), *Ecklon and Zeyher 838* (C, G, P, SAM, W); in collibus prope Caledon (-AB), –/1/1901, *H. Bolus 9216* (BOL); at foot of Onrust River Mountain (-AC), 20/2/1941, *Esterhuysen 4906* (BOL, NBG, PRE), 28/2/1925, *Compton 3370* (BOL); Onrust River above Hemel en Aarde road, 1/12/1951, *Esterhuysen 19257* (BOL); Fernkloof, Hermanus, Caledon Division (-AD), 300 ft., 6/8/1971, *Williams 1499* (NBG, PRE), 800 ft., 5/10/1971, *Williams 1543* (NBG); Hermanus mountain above the Golf Course, 850 ft., 7/8/1971, *Williams 1504* (NBG); Weltevreden, N. of Stanford, 350 ft., 30/8/1971, *Williams 1523* (NBG); lower slopes of Klein River Mtns., –/9/1940, *Esterhuysen 2911* (BOL), 500 ft., 18/5/1941, *Stokoe 9150* (BOL); Zondagskloof, Caledon Division (-BC), 29/12/1940, *Compton 10227* (NBG); Duinefontein near Gansbaai, Bredasdorp Division (-CB), 7/1/1962, *Rycroft 2383* (NBG):

between Gansbaai and Stanford, roadside, Caledon Division, 29/12/1940, *Walgate 89* (BOL); slopes of Gunners Quoin near Ratel River, Bredasdorp Division (-DA), 10/2/1958, *Lewis 5259* (SAM); Awila, S. of Baardscheedersbos, 50 ft., 25/5/1973, *Williams 1804* (BG); south of Napier, Bredasdorp Division (-DB), 18/2/1951, *Compton 22653* (NBG, S).

Without precise locality: *D. obtusata* (B-W *4785.1), D. oppositifolia* Thunberg (B-W *4789.1), D. succulenta 1.* (B-W *4798.1), D. succulenta 2. (Diosma rigidulum et succulentum)* (B-W *4798.2), Diosma carnosa* Sol. Promont. B. Spei, 1771, *Banks and Solander s.n.* (BM, C, LINN *270/2*), *D. scabra, Sonnerat s.n.* (P, P-LA), *D. decussata, Sonnerat s.n.* (P, P-LA); *Sparrman s.n.* (LINN), e Cap. b. Spei. *Thunberg 5714* (UPS), *5715* (UPS), *Masson s.n.* (BM), *Roxburgh s.n.* (BM), 1772, *Oldenburg 243* (BM), *Bowie s.n.* (BM), *Masson s.n.* (BM), *Sieber 65, 193, 194* (P), 1848, *Boivin 743* (BOL, P).

DISTRIBUTION, VARIATION AND HYBRIDISATION

Diosma oppositifolia is found growing on flats or mountains in sandy soil derived from the quartzitic rocks of the Table Mountain geological series at altitudes of up to 700 m (2 300 ft.). Being a plant with a persistent rootstock from which it regenerates after fires it does not appear to form dense colonies and, although seed is fairly liberally produced, seedlings are very seldom seen. This species is distributed along a more or less N.W.-S.E. axis from Zonguasfontein north of Darling to Gunners Quoin near Quoin Point in the south with perhaps the main concentration being found on the Cape Peninsula towards the middle of its range.

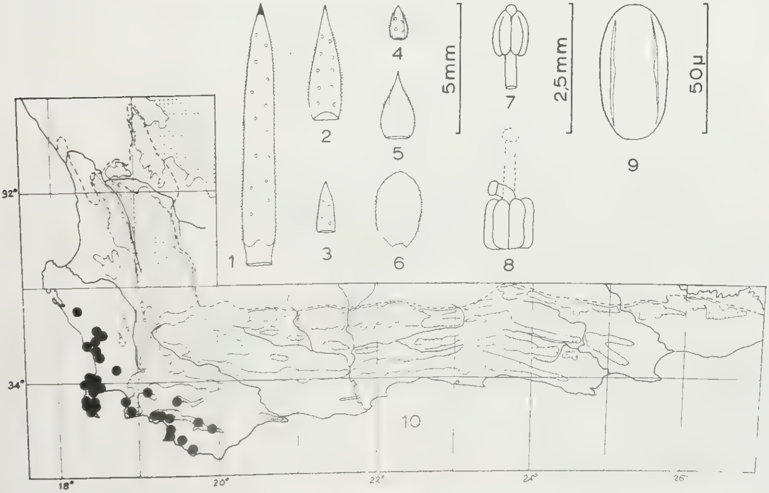

FIG. 15.

Diosma oppositifolia: 1, leaf. 2, large bract. 3, small bract. 4, bracteole. 5, calyx lobe. 6, petal. 7, anther. 8, gynoecium. 9, pollen. 10, distribution.

When regenerating after fires the vigorous shoots may produce leaves opposite, alternate, or 3-nate. Plants found growing on the sandy flats towards the north west have leaves that are thicker with the mucro more obtuse. Fruits from plants towards the south east have slightly longer horns. Successively smaller leaves and branchlets are produced each season as the plant ages.

Hybridisation is extremely rare but the following putative hybrids with *Diosma hirsuta* L. have been observed:

Steenbras Siding, Caledon Division, –/7/1940, *Esterhuysen 2685* (BOL); Onrust River above Hemel and Aarde road, Caledon Division, 1/12/1951, *Esterhuysen 19275a* (BOL).

Diosma oppositifolia is a distinct species being a shrub usually low with many stems arising from a persistent rootstock; with leaves either elliptic-lanceolate obtuse with a small blunt callus or linear-lanceolate acute with the apex recurved with a small sharp mucro, complicate when dry, spreading-erect, normally opposite; with flowers sessile aggregated up to 8 in pairs, with no staminodes; with anthers bearing a sessile apical gland and with seeds shining, relatively large. *Diosma dichotoma*, the only other species of *Diosma* with opposite leaves and no staminodes, is distinguished by having much smaller leaves and the anther-gland sub-stipitate. From *Diosma subulata*, a tall species, single-stemmed at base, with leaves either opposite or alternate, *D. oppositifolia* is distinguished by its many stemmed habit and lower growth.

15. Diosma dichotoma Berg., Descr. Plant. Cap.: 63 (1767). Type: *Diosma mihi dichotoma e Cap. b. Sp. Grubb* (Berg. Scrips.) (S-BT, holotype; C, isotype).

Non *Diosma cupressina* L., Mant.: 50 (1767) which from the description, in the absence of type material, belongs most probably in the *Bruniaceae*.

Icones: *Diosma cupressina* Wendl., Coll. Plant. 2:59, Tab. 61 (1810); Lodd., Bot. Cab. **4:** 303, tab. 303 (1819); *Diosma dichotoma* Berg. Mason, W. Cap. Sandv. Fls.: 142, pl. 60, fig. 3 (1972).

Shrubs 0,5-0,6 m tall, spreading 1 m diam., forming a dense rounded bush with many stems arising from a stout underground root-stock. *Branches* fairly erect, glabrescent, greyish-brown, roughened with leaf scars. *Branchlets* numerous, erect, slender, minutely puberulous, reddish-brown where exposed, dichotomous or opposite. *Leaves* 1,5-4 mm long, 1,1-1,4 mm broad, lanceolate, acute opposite, decussate, adpressed-erect, sessile; hyaline margins narrow, minutely ciliolate; apex minutely callused; midrib fairly prominent; abaxial surface with large scattered gland dots. *Inflorescence* terminal, 1 to 3-nate, normally 2-nate, sessile, 8 mm diam., star-like, white; *calyx* thinly puberulous. *Bract* one to each flower, 1,8 mm long, 1,3 mm broad, ovate-lanceolate; apex with an elevated point; hyaline margins ciliolate; adaxial surface pubescent in the middle; abaxial surface gland-dotted, scabrid. *Bracteoles* two, 1,9 mm long, 0,9 mm broad, lanceolate, somewhat minutely pubescent on all sides, apex echinulate with a minute point; hyaline margins ciliolate; abaxially gland-dotted to either side of the midrib. *Calyx lobes* five, 2,4 mm long, 1,4 mm broad, deltoid-lanceolate, acute with an elevated sub-echinulate point; hyaline margins broad below, pinkish coloured, ciliolate; adaxial surface puberulous; abaxial surface scabrid-puberulous, gland-dotted. *Petals* five, 3,6-3,8 mm long, 1,5-1,8 mm broad, oblong-lanceolate, acute, spreading widely; margins irregular, semi-translucent, very sparsely and minutely ciliolate, later curling inwards above; midrib slightly raised at the apex, one or two small gland dots. *Staminodes* absent. *Filaments* five, 2 mm long, acicular, glabrous. *Anthers* five, before anthesis 1,4 mm long, 0,7 mm broad, yellow; apex tapering to a recurved gland which exudes a droplet of nectar in the angle for the curve. *Pollen* 58 μ long, 28 μ broad, oblong. *Disc* stands wide open, sinuate-crenulate, green, minutely dimpled, exudes nectar, exceeds the ovary by a long way. *Stigma* 0,3 mm diam., capitellate, globose. *Style* becoming almost 2 mm long, glabrous, deflexed at first. *Ovary* 5-carpellate, 0,7 mm long, 0,8 mm diam., glabrous except for a few minute hairs around the globose apices of the carpels. *Fruit* 5-carpellate, 7,5 mm long, 7,5 mm diam.; *carpels* glabrous, abaxially dimpled with sunken oil glands; apex truncate, virtually hornless, radially narrowly cleft with an immersed gland at the outer end. *Seed* 5,7 mm long, 2,4 mm broad, black, shining; aril small, black at base.

A careful study of the description of the species *Diosma cupressina* L. reveals that it could not refer to the species *Diosma dichotoma* Berg. There are three obvious characteristic differences: leaves alternate, calyx membranaceous and petals clawed, whereas the species *D. dichotoma* has leaves opposite, calyx quite substantial and petals sessile. It is possible that the species *D. cupressina* L. is *Thamnia uniflora* Solander ex Brongniart (vide Sheet No. 270/23 in Linnaeus' Herbarium), a very rare plant that has seldom been collected. On the other hand *D. dichotoma* has been quite frequently collected in the vicinity of Cape Town. One may therefore understand how the more commonly found and superficially similar plant became attached to the wrong name. This error has in the past been perpetuated by many authors who have simply copied one another. The above description based upon fresh material amplifies those given by previous authors in describing what they thought to be *D. cupressina*.

Specimens Examined

CAPE—3318 (Cape Town): Coeratenberg near Hopefield (-AB), –/1/1887, *Bachmann 5968* (BOL); a few miles along the road to Langebaan from the Darling to

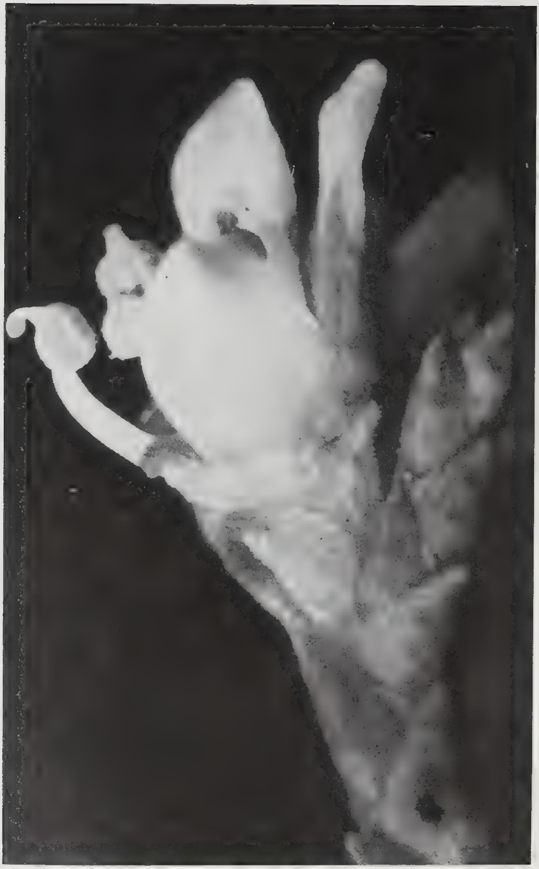

Fig. 16.
Flower of *Diosma dichotoma* with petal removed showing the reflexed anther gland.

Ysterfontein road (-AC), 3/5/1972, *Esterhuysen s.n.* (BOL, S); Malmesbury Division near Bokbaai (-CB), 15/9/1940, *Esterhuysen 18873* (BOL, PRE), 21/7/1976, *Williams 2184* (NBG), 25/1/1977, *Williams 2264* (NBG); road to Melkbosch Strand near turn-off from main road –/7/1940, *Esterhuysen 4365* (BOL), 23/9/1951, *Esterhuysen 18873* (BOL, PRE); Flats near Vygieskraal (-DC), 29/12/1895, *Wolley Dod 727* (BM); near Doornhoogde, 25/12/1896, *Wolley Dod 2197* (BOL); in the Cape Downs on the road between Luyaardsfontein and Salt River, 13/4/1815, *Burchell 8381* (GOET, K, P, SAM, W); Sandhills between Cape Town and Stellenbosch, 200 ft., (III, E. b), 29/4/1828, *Drège 7150* (P, S); Damp flats between dunes and railway embankment near

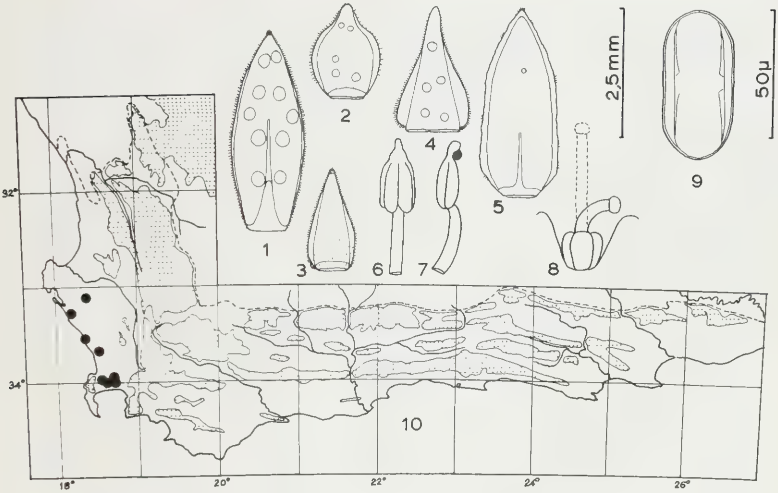

FIG. 17.
Diosma dichotoma: 1, leaf. 2, bract. 3, bracteole. 4, calyx lobe. 5, petal. 6, anther. 7, side view of anther with droplet of nectar. 8, gynoecium. 9, pollen. 10, distribution.

Sarepta, 22/12/1932, *Acocks 1239* (S); in plains at Klipfontein, –/11/–, *Zeyher 290* (BOL, K, S).
—3418 (Simonstown): Cape Flats 2 miles W. of Faure (-BA), 19/1/1934, *Salter 4249* (BM, BOL, PRE), 9/1/1934, *Galpin 12713* (PRE); Isoetes Vlei, Cape Flats, 13/1/1969, *Matthews 40* (NBG); In sandy Cape plains near Hottentotsholland, –/6/–, *Ecklon & Zeyher 853* (C, GOET, LD, P, PRE, S, SAM, W).

Without precise locality: *Diosma mihi dichotoma e Cap. b. Sp. Grubb* (S-BT, C), *Masson s.n.* (BM), *Roxburgh s.n.* (BM), *Mund s.n.* (K).

The locality "on moist hills of George and Swellendam" given by *Bowie s.n.* (BM) is extremely dubious.

DISTRIBUTION AND VARIATION

Diosma dichotoma is found growing on the sandy plain from near Faure in the south to near Hopefield in the north, usually fairly close to the sea coast.

No significant variation has been observed.

Diosma dichotoma is recognised as distinct being a dense shrub up to 0,6 m tall, spreading to 1 m in diam. with leaves 1,5-4 mm long, lanceolate-acute, sessile, adpressed, opposite, with anthers tipped with a sub-stipitate reflexed gland and with fruits truncate, hornless. *D. oppositifolia*, the only other species of *Diosma* with opposite leaves and no staminodes, is distinguished by having much larger leaves and a sessile apical anther-gland.

2. DIOSMA sectio **TUMELLA** Williams, sect. nov. propria propter florem staminodiis vestigialibus. Type: *D. prama* Williams.

Section *Tumella* is distinguished in having the flower with vestigial staminodes.

16. *D. aristata*
17. *D. rourkei*
18. *D. thyrsophora*
19. *D. tenella*
20. *D. recurva*
21. *D. prama*
22. *D. echinulata*
23. *D. guthrei*
24. *D. haelkraalensis*
25. *D. demissa*
26. *D. apetala*
27. *D. passerinoides*
28. *D. strumosa*

16. Diosma aristata Williams in Jl S. Afr. Bot. **41**.3: 180 (1975). Type: CAPE—3422 (Mossel Bay): On the north slopes of a hill about 2,5 km east of Mossel Bay near the reservoir (-AA), 170 m alt., 6/5/1974, *Williams 1902* (NBG, holotype; BOL, C, GRA, K, MO, M, PRE, S, STE, isotypes).

Diosma aristata is recognised as distinct on account of being a plant rising from a single stem at the ground with very large aristate alternate leaves, and completely glabrous except for the apices of the horns on the fruits.

17. Diosma rourkei Williams in Jl S. Afr. Bot. **41**.3: 176 (1975). Type: CAPE—3324 (Steytlerville): Baviaanskloof, on the Pisgoedvlakte about 2 km from the farm Goedehoop on the road to Willowmore, Humansdorp Division (-CB), 550 m alt., 18/6/1974, *Rourke 1416* (NBG, holotype; BOL, C, GRA, K, M, MO, PRE, S, STE, isotypes).

Diosma rourkei is a distinct species being an erect shrub up to 2 m tall, single-stemmed for 250 mm at the base with branches crowded into small tufts, leaves linear-lanceolate acute, the flowers aggregate, petals sessile and the style always erect. It differs from *D. thyrsophora* which has leaves obtuse, petals narrowing to the base and the style at some stage deflexed.

18. Diosma thyrsophora Eckl. & Zeyh., Enum. plant.: 107 (1835). Type: In solo ericeto (altit. 4,5) laterum montium prope fluvium Rivierzonderend supra villam Knoblauch (Swellendam), Febr. Mar. *Ecklon & Zeyher 840* (S, lectotype; C, S, SAM, isotypes).

Shrubs up to 3 m tall arising from a single stem towards the base, (one plant 2,8 m tall, measuring 29 mm diam. at the base, showed about 19 growth rings); bark brown, becoming rough with horizontal scars. *Branches* erect, fairly slender, glabrous, brownish-red, the outer skin splitting off, often dividing irregularly in twos. *Branchlets* somewhat tufted, very slender, numerous, glabrous, spreading, alternate, yellowish, leafy, many eventually dying back and falling off. *Leaves* 4,5–6,5 mm long, 1–1,5 mm broad, much smaller on floral branchlets, linear-lanceolate, obtuse, glabrous, sessile, spreading-erect, alternate; margins eciliate, narrowly translucent with a few smaller immersed gland dots; midrib not prominent with gland dots scattered to either side; adaxially flat when fresh. *Inflorescence* terminal on very short branchlets, 1, 2 or rarely 3-nate; *flowers* 6 mm diam., pedicellate; petals white, widely spaced. *Bract* 0,9–1,4 mm long, 0,5 mm broad, deltoid or lanceolate, obtuse, glabrous, gland-dotted; apex glandular; margins below very narrowly translucent and sub-ciliolate. *Bracteoles* two, 0,9 mm long, 0,5 mm broad, oblong-lanceolate, obtuse, glabrous, 1 or 2 gland-dotted; apex thickened, glandular; margins translucent, very sparsely ciliolate below. *Calyx lobes* five, about 1,2 mm long, 1 mm broad, sub-orbicular, obtuse, glabrous, 3–4 gland-dotted; apex thickened, rather curled inwards; margins broadly translucent, sparsely ciliolate; supports the reflexed anthers before anthesis. *Petals* five, 2,3–2,6 mm long, 1,3–1,4 mm broad, oblong, obtuse, glabrous except for one or perhaps two long hairs on the adaxial surface, narrowing below to a short claw, white, soon delapsing; margins rather irregular with one or two setae. *Staminodes* five, a spherical gland at the outer edge of the disc, about 0,1 mm diam., becoming 0,2 mm long after the filaments have delapsed, persisting. *Filaments* five, becoming 1,5 mm long, acicular, pale, glabrous. *Anthers* five, 0,9 mm long, 0,7 mm broad, before anthesis, orange-coloured; apical gland pink, deflexed inwards. *Pollen* 57 μ long, 27 μ broad, oblong. *Disc* sinuate-crenulate, stands wide open, pink, exudes nectar. *Stigma* 0,25 mm diam., globose, green, capitellate, becoming sticky. *Style* becoming 1,6 mm long, terete, glabrous, purplish, deflexed at some stage. *Ovary* 5-carpellate, 0,8 mm diam., 0,7 mm long, glabrous; apices globose, green. *Fruit* 5-carpellate, 10 mm long, 8 mm diam., base pointed 1,5 mm long; carpels very pale green, glabrous, gland-dotted; *horns* very short, spreading, apex immersed-glandular. *Seed* 5–6 mm long, 2,5–3 mm broad, black, shining: aril black with a few stripes.

Diosma thyrsophora was discovered by Zeyher in the Riviersonderend Mountains above the farm of Mr. Knoblauch whose descendants [illegible] still farming in this area. *D. thyrsophora* and *D. recurva* were regarded by Sonder (1860) as being conspecific but *D. thyrsophora* is a much taller plant with branchlets more numerous and more slender, with leaves linear-lanceolate not elliptic or oblong with petals without gland dots and with the calyx glab-

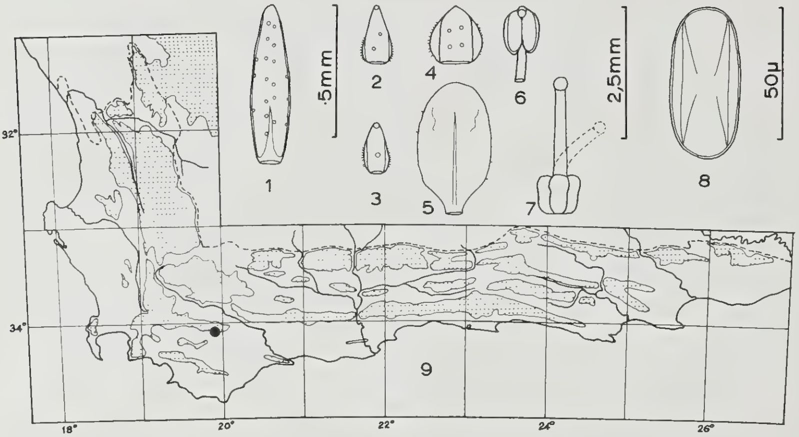

FIG. 18.
Diosma thyrsophora: 1, leaf. 2, bract. 3, bracteole. 4, calyx lobe. 5, petal. 6, anther. 7, gynoecium. 8, pollen. 9, distribution.

rous not pubescent. The above description prepared from fresh material amplifies those previously given.

SPECIMENS EXAMINED

CAPE—3419 (Caledon): In solo ericeto (altit. 4,5) laterum montium prope fluvium Riviersonderend supra villam Knoblauch (-BB), Feb. Mar., *Ecklon and Zeyher 840* (S, C, SAM); Riviersonderend, –/10/1940, *Stokoe 9012* (BOL); in kloof near Riviersonderend, 12/2/1956, *Esterhuysen 25335* (BOL); upper slopes Riviersonderend peak, 3 000 ft., –/11–12/1928, *Thorne s.n.* (SAM); Riviersonderend Mtns., Olifantskloof near Municipal weir, 800 ft., 5/5/1971, *Kruger 1242* (STE); Olifantskloof at the third weir, Riviersonderend, 700 ft., 22/4/1975, *Williams 1992* (NBG), 25/10/1975, *Williams 2130* (NBG).

DISTRIBUTION

Diosma thyrsophora appears to be confined to the mountains to the north of the town of Riviersonderend.

No variation has been observed.

Diosma thyrsophora is a distinct species growing up to 3 m tall, totally glabrous, single-stemmed at base with branchlets numerous, very slender, somewhat clustered, with leaves linear-lanceolate, obtuse, sessile, alternate, gland-dotted along either side of the midrib and on margins, with petals with one or two scarcely discernible hairs about the middle, narrowing below to a short claw and with the anther gland deflexed.

19. Diosma tenella Williams, sp. nov. propria propter semen testa rugosa.

Frutex 0,3–0, m altus, erectiuculus, ad basim monocaulis. *Rami* brevi, gracili, sparsim puberuli, rubescenti. *Folia* 5,1–7,1 mm longa, 0,8–0,9 mm lata, lineari-oblonga, obtusa, glabra, eciliata, alterna, gladnuloso-punctata, minute albo-mucronata. *Inflorescentia* solitaris, terminalia, reducto-racemosa; flos 5 mm diam., calyx puberulus. *Bractea* 1,5–2,4 mm longa, 0,6–0,7 mm lata, lanceolata, sub-obtusa, glabra, glanduloso-punctata, marginibus sparsim ciliolatis. *Bracteolae* duae, 0,7 mm longae, 0,6 mm latae, orbiculares, crassius culae, intus minute puberulae, extus glabrae glanduloso-punctatae. *Sepala* quinque, 1 mm longa, 1 mm lata, sub-orbicularia, crassiuscula, intus puberula, extus glabra glanduloso-punctata, marginibus minute ciliolatis anguste translucentia. *Petala* quinque, 2,2 mm longa, 1,5–1,6 mm lata, ovata, obtusa, sessilia, glabra, alba, glanduloso-punctata, subrosea. *Staminodia* quinque, 0,1 mm diam., globosa, vestigialia. *Filamenta* quinque, 1,7 mm longa, glabra. *Antherae* quinque, ante anthesin 1 mm longae, 0,7 mm latae, floridae, glandula globosa semi-immersa coronata. *Pollen* 46 μ longum, 22 μ latum, ellipsoideum. *Discus* sinnuato-crenulatus, viridus, patens, ovarium excedens. *Stigma* 0,15 mm diam., viridum, capitellatum. *Stylus* prima deflexus deinde 1,1–1,8 mm longus, glaber, longe persistens. *Ovarium* 5-carpellatum, 0,5 mm longum, 0,7 mm diam., glabrum, viridum, apicibus globosis. *Frucuts* 5-carpellatus, 5 mm longus, 7 mm diam., glaber, multi-glanduloso-punctatus, rubescens; cornua 1 mm longa, obtusa, immerso-gladulosa coronata. *Semen* 3–3,5 mm longum, 1,8–2 mm latum, piceum, rugosum.

Type: CAPE—3420 (Bredasdorp): Bredasdorp/Skipskop road 23 km from Bredasdorp at boundary of farms Moerasfontein and Uyshoek (-CB), 12 m (40 ft.) alt., 20/6/1979, *Williams 2781* (NBG, holotype; BOL, K, MO, PRE, S, isotypes).

Shrubs 0,3–0,4 m tall, fairly erect, spreading 0,5 m or more, diffuse, in this locality single-stemmed at base. *Branches* spreading, variously bent, glabrous; bark smooth, ashy-brown. *Branchlets* short, fairly erect, slender, thinly puberulous, reddened, not hidden by the leaves. *Leaves* 5,1–7,1 mm long overall, 0,8–0,9 mm broad, linear-oblong, obtuse, glabrous, eciliate, short-petiolate, alternate, spreading or somewhat erect; apex minutely whitish-mucronate; abaxial surface convex, lumpy with gland dots to either side of the midrib. *Inflorescence* solitary, terminal in very much reduced racemes; buds pink; *flowers* 5 mm diam., calyx puberulous. *Bract* varies in size, 1,5–2,4 mm long, 0,6–0,7 mm broad, lanceolate, sub-obtuse, glabrous, gland-dotted; margins very sparsely ciliolate, not translucent. *Bracteoles* two, 0,7 mm long, 0,6 mm broad, orbicular, quite thick; adaxial surface minutely pubescent; abaxial surface glabrous, gland-dotted; margins minutely ciliolate, very narrowly translucent. *Calyx lobes* five, 1 mm broad, 1 mm long, sub-orbicular; adaxial surface concave, minutely pubescent; abaxial surface glabrous, gland-dotted; margins minutely ciliolate, narrowly translucent. *Petals* five, 2,2 mm long, 1,5–1,6 mm broad, ovate, obtuse, sessile, white, glabrous, abaxially gland-dotted, flushed with pink. *Staminodes* five, 0,1 mm diam., a spherical gland at the base of the petal on the outside of the disc. *Filaments* five, becoming 1,7 mm long, glabrous, acicular. *Anthers* five, before anthesis 1 mm long, 0,7 mm broad, yellow; apical gland globose semi-immersed. *Pollen* 46 μ long, 22 μ broad, ellipsoid. *Disc* sinuate-crenulate, green, stands open, exceeds the ovary. *Stigma* 0,15 mm diam., capitellate, green. *Style* deflexed at first becoming 1,3–1,8 mm long, glabrous, persisting for some time. *Ovary* 5-carpellate, 0,5 mm long, 0,7 mm diam., glabrous green, apices globose. *Fruit* 5-carpellate, 5 mm long, 7 mm diam., glabrous, multi-gland-dotted, reddened in the grooves between the carpels and below; *horns* 1 mm long, very short, obtuse; apex with a deeply immersed gland. *Seed* 3–3,5 mm long, 1,8–2 mm broad, black, *minutely wrinkled*, not shining except when magnified; aril dirty brown.

It would seem that this plant was first discovered by Burchell on the 27th November 1814 "on the road over the mountains from our station at Klein Vette River to our station at the foot of the Great Southern Range at Mountain Station". This locality lies to the north of Riversdale towards Garcia Forest Station. It was collected by Muir in 1908 on the Riversdale commonage and again by Esterhuysen in 1950 at Garcia Forest Station. Recent searches in this area have failed to rediscover this species. Fortunately it has now been found growing in several places in the Bredasdorp District by Mr. Chris Burgers whose keen interest and observations in this connection are very much appreciated.

SPECIMENS EXAMINED

CAPE—3220 (Montagu): Strawberry Hill, Langeberg, Heidelberg Division (-DD), –/12/1954, *Stokoe s.n.* (SAM *68917*).

—3420 (Bredasdorp): De Hoop-Potberg Nature Reserve, flats, course of Pottebergsrivier, 4 km. W.S.W. of Potberg buildings, Bredasdorp Division (-AD), 110 m, 21/6/1979, *Burgers 1980* (STE); Melkbosheuwel, 4 km W. of Potberg Residence, 120 m, 19/8/1980, *Burgers 2457* (STE); On the road between Zuurbraak and the ford (at Sibilljes) through Buffelsjagts River (the drift), Swellendam Division (-BA), 4/1/1815, *Burchell 7269* (K); De Hoop-Potberg Nature Reserve, 3,5 km. S.E. of Potberg homestead (-BC), 500 ft., 13/8/1980, *Williams 3046* (NBG, PRE), 150 m, 18/1/1979, *Burgers 1693* (STE), 180 m, 18/8/1980, *Burgers 2455* (STE); Bredasdorp/ Skipskop road 23 km from Bredasdorp at boundary of Farms Moerasfontein and Uyshoek (-CB), 10 m, 17/6/1979, *Burgers 1886* (STE), 12 m (40 ft.), 20/6/1979, *Williams 2781* (NBG, BOL, K, MO, PRE, S), 13/8/1980, *Williams 3050* (NBG, BOL, MO, PRE).

—3421 (Riversdale): on the road over mountains from our station on Klein Vette River to our station at the foot of the Great Southern Ranqe at "Mountain Station" (-AA), 27/11/1814, *Burchell 6860* (K); Riversdale Commonage, –/12/1908, *Muir 41*

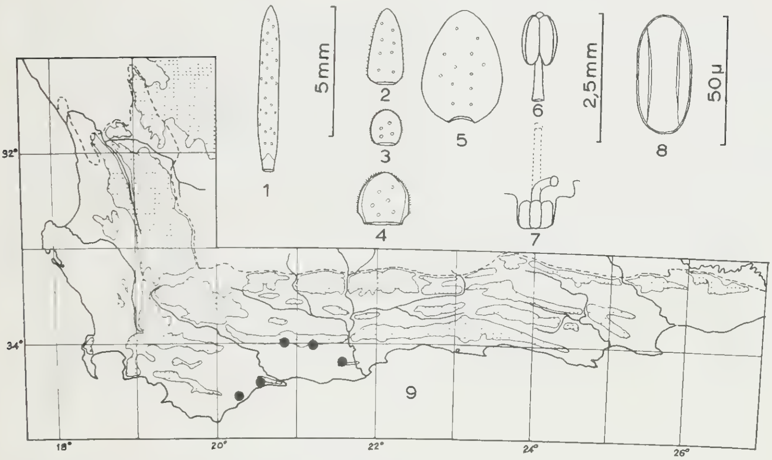

Fig. 19.
Diosma tenella: 1, leaf. 2, bract. 3, bracteole. 4, calyx lobe. 5, petal. 6, anther. 7, gynoecium. 8, pollen. 9, distribution.

(SAM *6681*); Slopes of Langebergen at Garcia Forest Station, Riversdale Division, 25/5/1950, *Esterhuysen 17241* (BOL); Near Albertinia, Riversdale Division (-BA), 20/1/1951, *Compton 22594* (NBG).

Distribution and Variation

Diosma tenella is found growing on sandy soils associated with a variety of geological formations including Bokkeveld shales, ferricrete, silcrete and gravels. It occurs fairly near the coast in the Bredasdorp Division, on the foothills of the Langebergen near Heidelberg and Riversdale and at Albertinia. It appears to be rather rare, having been very seldom collected.

A certain amount of variation appears to occur. Whilst plants in the type locality appear to be single-stemmed at base, those in other localities seem to be able to resprout after fires. Some populations have leaves rather erect with apices obtuse and others have the leaves spreading, of a lighter colour, and more acute. The leaves of a specimen from Strawberry Hill have a rather knotty appearance with the glands deep set but in other populations this character is not so obvious. It was noticed that the leaves of those populations examined in a fresh state gave off a very distinctive smell reminiscent of fresh red bait (ascidian) when crushed regardless of any variation in appearance.

Diosma tenella is recognised as distinct because of having *leaves* small, linear, mucronate, multi-gland-dotted, with the midrib slender and with cartilaginous margins very narrow; *petals* gland-dotted. Moreover this is the only species of the *Diosmeae* so far encountered that has the seed surface wrinkled rather like a fingerprint.

The name was that used by Burchell on the ticket attached to his specimen No. 6860.

20. Diosma recurva Chamisso in Linnaea **5**: 51 (1830). Type: Cango, –/5/1819, *Mundt and Maire s.n.* (S, lectotype).

Diosma ericoides sensu L., Sp. Pl. ed. 2.**1**: 287 (1762).

Non *Diosma ericoides* L., Sp. Pl. **1**: 198 (1753). Type: Pluk. Phytogr. t. 279. f. 5 (1696), iconolectotype. See also Williams in Jl S.Afr. Bot. **47.**1: 79 (1981).

Shrubs 0,7–1 m tall, single-stemmed at base, pale green in appearance. *Branches* erect, forked; bark grey, fairly smooth. *Branchlets* erect, numerous, slender, yellowish-green, thinly puberulous, leafy. *Leaves* up to 3,5 mm long, 2 mm broad, elliptic, obtuse, glabrous, alternate, 5-ranked, short-petiolate, spreading, slightly reflexed; apex with an immersed gland; margins gland-dotted, very sparsely and minutely ciliolate mainly below; adaxial surface dark green, smooth, fairly flat; abaxial surface gland-dotted along the midrib. *Inflorescence* solitary in terminal and sub-terminal clusters, sessile on very short branchlets. *Bract* one, about 1,5–1,75 mm long, 1–1,4 mm broad, deltoid, obtuse, ciliolate; adaxial surface concave, slightly pubescent below; abaxial surface thinly puberulous below; midrib raised, gland-dotted. *Bracteoles* two, 1,2–2 mm long, 0,75–1 mm broad, elliptic, obtuse, ciliolate; adaxial surface concave, puberulous in the hollow; abaxial surface sparsely puberulous below, gland-dotted along the midrib. *Calyx lobes* five, 1,5 mm long, 1,5 mm broad, oblong-deltoid, obtuse, ciliolate; adaxial surface flat, puberulous; abaxial surface sparsely puberulous below, gland-dotted along the midrib. *Petals* five, 2–2,3 mm long, 1,5–2 mm broad, ovate or subquadrangular, obtuse, very sparsely ciliolate, white, glabrous, somewhat connate with the disc; abaxial surface gland-dotted towards the midrib. *Staminodes* five, 0,2–0,3 mm long, glandular at the apex, arising towards the outer edge on the summits of the disc. *Filaments* five, becoming 1,8 mm long, acicular, glabrous. *Anthers* five, before anthesis 0,8 mm long, 0,7 mm broad, yellow or reddish tinged with orange; apical gland globose, pointing inwards. *Pollen* 53 μ long, 25 μ broad, obloid. *Disc* 5-lobed, 2 mm diam., double the height of the ovary, forming a cup, edges thickened, nectariferous, olive green. *Stigma* 0,15 mm diam., globose, capitellate. *Style* may be deflexed at some stage becoming erect, 1,6 mm long, glabrous. *Ovary* 5-carpellate, 0,9 mm long, 0,8 mm diam., lobes obtuse, glabrous, green. *Fruit*

5-carpellate, each carpel 6–9 mm long with horn 2–4 mm long, glabrous, gland-dotted. *Seed* 5–8 mm long overall, 2–3 mm broad, black, shining; aril white.

The specimen of *D. recurva* in Linnaeus' herbarium labeled *Diosma 4 ericoides* was received by Linnaeus sometime between 1755 and 1759. Nothing is known about who collected it or where it was collected. Fragments of the same collection found their way into several Swedish herbaria and were all labeled *Diosma ericoides* L. apparently because Linnaeus had decided that it agreed with his original concept of this species. *D. ericoides* L., Sp. Pl. Ed. 1 (1753) is now a synonym of *D. hirsuta*. The specimen of *D. recurva* seen by Chamisso, if it was housed in the Berlin herbarium, was most certainly destroyed during the 1934/45 war. Fortunately a portion, a small twig 14,5 mm long, is preserved in the herbarium of the Rijksmuseum at Stockholm. This has been chosen as the lectotype. It was collected in May 1819 by Mundt and Maire who gave the locality as "Cango" which is a rather vague area in the vicinity of Calitzdorp. Being without fruits, it closely resembles a specimen collected by Esterhuysen *(25890)* on the Touwsberg on 1st June 1956. The above description prepared from fresh material amplifies those previously given.

SPECIMENS EXAMINED

CAPE—3320 (Montagu): Touwsberg, dry rocky buttress of ridge on S. slopes, Ladismith Division (-DB), 3 000–3 500 ft., 1/6/1956, *Esterhuysen 25890* (BOL, PRE, S); Warmwatersberg, State Forest W. of summit, S. Slopes, Swellendam Division

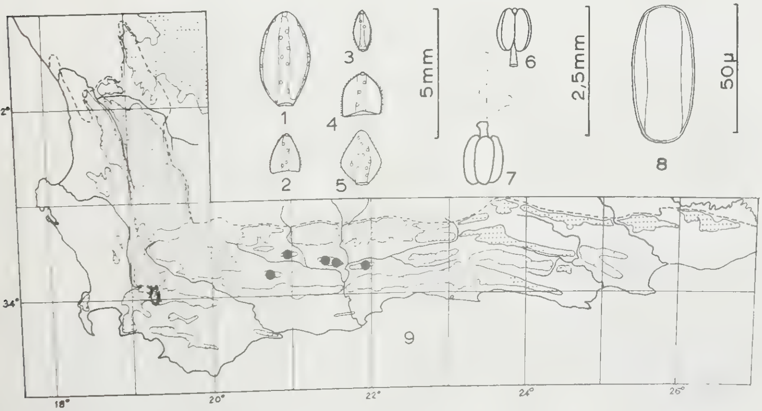

FIG. 20.
Diosma recurva: 1, leaf. 2, bract. 3, bracteole. 4, calyx lobe. 5, petal. 6, anther. 7, gynoecium. 8, pollen. 9, distribution.

(-DC), 20/6/1971, *Kruger 1350* (JF); Warmwatersberg, S. Side near Barrydale, 3 600 ft., 4/12/1974, *Williams 1941* (NBG).
—3321 (Ladismith): Rooiberg, track to Mt. Ararat, Ladismith Division (-CB), c. 2 000 ft., 18/12/1977, *M. F. Thompson 3577* (STE); Roodeberg, S. Slopes, Ladismith Division (-DA), 24/5/1950, *Esterhuysen 17146* (BOL, PRE); Zoutkloof, Gamka Nature Reserve, Oudtshoorn Division (-DB), 2 200 ft., 11/10/1976, *Williams 2220* (NBG).

Without precise locality: Cango, –/5/1819, *Mundt & Maire s.n.* (S).

Without locality: *Diosma ericoides* L. (LD-ACHAR, LINN, S, UPS-THUNB).

DISTRIBUTION AND VARIATION

Diosma recurva is found only on the mountains of the Little Karoo, the Warmwatersberg, Touwsberg, Rooiberg and Gamtoosberg. These are all more or less isolated "islands" of Table Mountain Sandstone projecting above the plains composed of weathered Bokkeveld shales. Very few collections have been made although the plants, where they occur, are not rare.

The only apparent variation lies in the size of the mature fruit and seed; those from the eastern end of its range on the Gamtoosberg at Zoutkloof being the largest.

Diosma recurva is recognised as being a distinct species firstly because of its very strong sweetish smell and because of having leaves elliptic, obtuse, pale green, recurved and petals glabrous, gland-dotted.

21. Diosma prama Williams in J1 S.Afr. Bot. **41**. 4: 250 (1975). Type: CAPE—3321 (Ladismith): North side of Rooiberg Pass (-CC), 570 m, 12/7/1974, *Williams 1905* (NBG, holotype; BOL, C, K, M, MO, PRE, S, STE, isotypes).

Diosma prama is recognised as a distinct species because of its having branchlets virtually glabrous; leaves with pustulate gland dots scattered mainly towards the midrib; calyx lobes pustulate with gland dots but without any apical callus; petals glabrous, style erect and staminodes 0,2 mm long. It differs from *D. ramosissima* which has a closely spaced row of gland dots on either side of the midrib of the leaf, branches, leaves and petals puberulous and no staminodes. It differs also from *D. passerinoides* Steud. which has branchlets puberulous, leaves with one or two gland dots on the margins as well as on the midrib, calyx lobes without gland dots but with an apical callus and staminodes vestigial.

22. Diosma echinulata Williams in J1 S.Afr. Bot. **41**. 4: 265 (1975). Type: CAPE—3421 (Riversdale): Above Afvalskloof, Vermaaklikheid, Riversdale Division (-AC), 183 m (600 ft.) alt., 21/1/1975, *Williams 1953* (NBG, holotype; K, M, MO, PRE, S, STE, isotypes).

Diosma echinulata is recognised as distinct because of its having leaves alternate, closely spaced, setose, mucronate, thick and petiolate; petals pubescent on the outside with a few hairs on the inside at the throat; ovary with the apices of the carpels setulose. It differs from *D. guthriei* which has leaves often opposite, glabrous, sessile with a blunt point and petals and ovary glabrous. It differs from *D. demissa* which is an entirely glabrous plant with obtuse leaves.

23. Diosma guthriei Glover in Ann. Bol. Herb. **1**. 3: 126 (1915). Type: In Collibus prope Bredasdorp, 300 ft., –/7/1895, *H. Bolus 8476* (BOL, lectotype; NBG, isotype). Rocky hill, Bredasdorp/Elim, 600 ft., 15/7/1895, *Guthrie 3844* (BOL, cited as part of the type material).

Icon: Edwards in Ann. Bol. Herb. **1**. 3. plate 15D (1915).

Shrubs 300–400 mm tall, spreading, rigid, arising from a very tough rootstock. *Branches* short, fairly stout, spreading or erect; bark greyish, rough. *Branchlets* fairly slender, short, erect, stiff, sometimes reddish, puberulous or glabrous, well clothed with leaves. *Leaves* 3–6,5 mm long, 2,5–3,7 mm broad, ovate, acute, opposite or alternate, spreading, sessile, glabrous; apex with a small blunt callus; margins thick, not translucent, spiky ciliolate, sometimes almost eciliate, gland-dotted; adaxial surface concave; abaxial surface in two planes with a prominent midrib with scattered gland dots. *Inflorescence* terminal, 2 or 3-nate; *flowers* white, sessile, opening widely. *Bract* one to each flower, 2,9–3,6 mm long, 1,3–1,6 mm broad, oblong, glabrous; apex thickened with a small callus; margins gland-dotted, scabrid above, minutely ciliolate below; midrib prominent. *Bracteoles* two, 2,1–2,9 mm long, 0,7–1 mm broad, oblong, obtuse, glabrous; apex thickened and three sided above with a small callus; margins minutely ciliolate, translucent below; midrib gland-dotted. *Calyx lobes* five, 3 mm long, 1,2 mm broad, oblong, sub-obtuse, glabrous; apex callused; margins translucent and ciliolate below. *Petals* five, 2,5 mm long, 2 mm broad, ovate, sub-obtuse, white, sessile and very much connate with the lobe of the disc; margins below sparsely ciliolate. *Staminodes* five, a spherical gland about 0,2 mm diam., situated outside of the margin of the disc. *Filaments* five, becoming 1,7 mm long, glabrous, acicular, spreading. *Anthers* before anthesis 1,3 mm long, 0,7 mm broad, yellow; apical gland globose. *Pollen* 60 μ long, 28 μ diam., oblong. *Disc* 5-sinuate-crenulate, pale green with a dark green margin, exceeds the ovary by a long way, exudes nectar. *Stigma* 0,3 mm diam., globose, green, capitellate. *Style* becoming 1,8 mm long, terete, glabrous, deflexed at first. *Ovary* 5-carpellate, 1 mm diam., glabrous, apices globose and pale green. *Fruit* 5-carpellate, up to 12 mm long including the horns each up to 5 mm long, 6 mm diam., glabrous, gland-dotted; *horns* recurved. *Seed* 4–5 mm long overall, 1.8–2.1 mm broad, black, shining; aril blackish on one side, streaked on the other.

It would appear that the type material of this species was collected at the same time by both Guthrie and Bolus in the limestone hills on the Elim side of Bredasdorp. The specimen depicted by G.E. Edwards accompanying the type description was that gathered by H. Bolus and has therefore been chosen as the lectotype. The above description prepared from fresh material amplifies that previously given.

SPECIMENS EXAMINED

CAPE—3149 (Caledon): near the vlei between Bredasdorp and Elim (-DB), 22/4/1932, *L. Bolus s.n.* (BOL *20529*); Springfontein near the Salt Pan, Bredasdorp Division, 50 ft., 1/8/1973, *Williams 1832* (NBG, PRE, STE), 10/12/1948, *Matthews 36* (NBG); Mierkraal, Bredasdorp Poort, 100 ft., 22/1/1975, *Williams 1957* (NBG); Brandfontein, sand dunes along coast (-DD), 13/10/1951, *Esterhuysen 18972* (BOL, NBG, PRE).

—3419 (-DB)/—3420 (-DA) (Caledon/Bredasdorp): The Poort on the road from Bredasdorp to Elim, –/9/1933, *Leighton s.n.* (BOL *21515*), *Compton 4371* (BOL), 5/8/1940, *Esterhuysen 3008* (BOL, GRA, NBG, PRE, SAM), 1/7/1947, *Compton 19566* (BOL, NBG), 4/8/1940, *Compton 9075* (NBG), 2/9/1943, *Barker 2497* (NBG, PRE), 24/1/1948, *Barker 269* (NBG), 300 ft., 11/11/1962, *Taylor 4311* (PRE, STE), –/1/1948, *Lewis 3095* (SAM), 100 ft., 11/11/1962, *Acocks 22990* (PRE).

—3420 (Bredasdorp): Rocky hill, Bredasdorp/Elim (-CA), 600 ft., 15/7/1895, *Guthrie 3844* (BOL); In collibus prope Bredasdorp, 300 ft., –/7/1895, *H. Bolus 8476* (BOL, NBG), 15/10/1951, *Esterhuysen 19137* (BOL, PRE); Kliprug (Frances Pratt), 15/10/1944, *Henrici 3708* (BOL); 5–6 miles from Struis Bay along road to Bredasdorp, 19/9/1962, *Esterhuysen 29711* (BOL); Sand dunes, Arniston, E. of Cape Agulhas, 24/9/1956, *Chamberlain 87* (BM); less than half a mile from Arniston towards Bredasdorp, 30–50 ft., 17/11/1971, *Williams 1599* (NBG); Bontebok Park, 16/4/1950, *Compton 21932* (NBG), 17/2/1951, *Compton 22626* (NBG); in calcareis planitie Zoutendalsvally, Miereskalk (-CA/CC), –/12/1938, *Krauss s.n.* (G); Struis Bay in

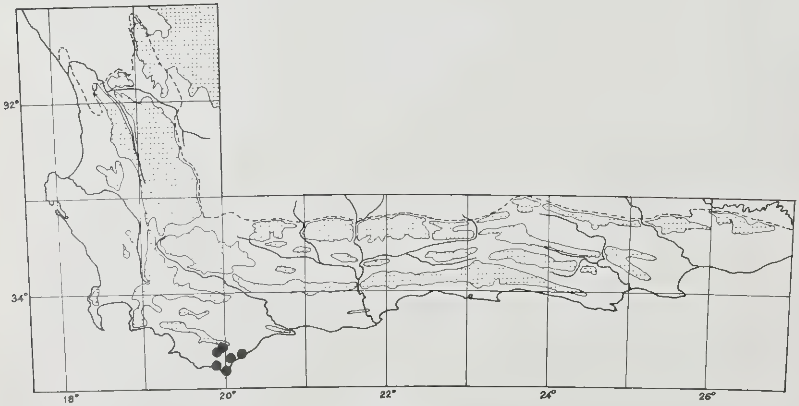

FIG. 21.
Diosma guthriei: distribution.

limestone (-CC), 5/8/1940, *Esterhuysen 3025* (BOL, PRE), 50 ft., 21/6/1972, *Williams 1658* (NBG, PRE); between Struisbaai and Cape Agulhas, Bredasdorp Division, 100 ft., 9/12/1971, *Williams 1604* (NBG, PRE), 15/1/1931, *Galpin 11276* (PRE); Cape Agulhas, limestone, 13/1/1956, *Rycroft 1866* (BOL, NBG), 18/9/1962, *Esterhuysen 29700* (BOL), 6/12/1938, *Wall s.n.* (S).

DISTRIBUTION

Diosma guthriei is found growing on or near tertiary limestone deposits in a fairly small area between Bredasdorp, Arniston and Cape Agulhas. It is one of four rather similar species occupying a similar habitat. To the east one finds *D. echinulata* and to the west *D. haelkraalensis* and *D. demissa*. No significant variation has been observed.

Diosma guthriei is recognised as distinct being a plant that grows normally on limestone with a very stout root and low stiff habit; having leaves ovate, alternate or opposite, glabrous; apices with a small blunt point; margins minutely serrulate or very short spiky ciliate, quite thick and with gland dots; flowers 2 or 3-nate, petals glabrous, ovary glabrous. It differs from *D. echinulata* which has petals pubescent; from *D. haelkraalensis* which has smaller recurved leaves with margins narrowly translucent and from *D. demissa* which has elliptic, obtuse leaves.

24. Diosma haelkraalensis Williams in Jl S. Afr. Bot. **45**. 2: 172 (1979). Type: CAPE—3419 (Caledon): 2 km E.N.E. of Groothagelkraal, Bredasdorp Division (-DA), 110–170 m (350–550 ft.) alt., 24/4/1978, *Williams 2486* (NBG, holotype; K, MO, PRE, S, isotypes).

Diosma haelkraalensis with its decumbent habit, very short branchlets, small somewhat recurved leaves and small white flowers is a distinct species. It differs from *D. demissa* which has leaves alternate, obtuse with a single row of gland dots along the midrib; from *D. guthriei* which has leaves ovate, often opposite, more erect and thicker with margins not translucent and from *D. echinulata* which has leaves alternate, lanceolate-elliptic, mucronate and sparsely setose on all sides.

25. Diosma demissa Williams in Jl S. Afr. Bot. **41**. 4: 261 (1975). Type: CAPE—3419 (Caledon): Between Stanfords Cove and De Kelders, near the sea, Caledon Division (-CB), 15 m (50 ft.) alt., 20/7/1974, *Williams 1909* (NBG, holotype; K, M, MO, PRE, S, STE, isotypes).

Diosma demissa is recognised as distinct having branches alternate and having leaves alternate, lanceolate, obtuse, petiolate, 5-ranked with a single row of gland dots on the midrib. It differs from *D. guthriei* which has branchlets often dichotomous, leaves much larger, ovate, acute, sessile, opposite or alternate with two rows of gland dots along the midrib.

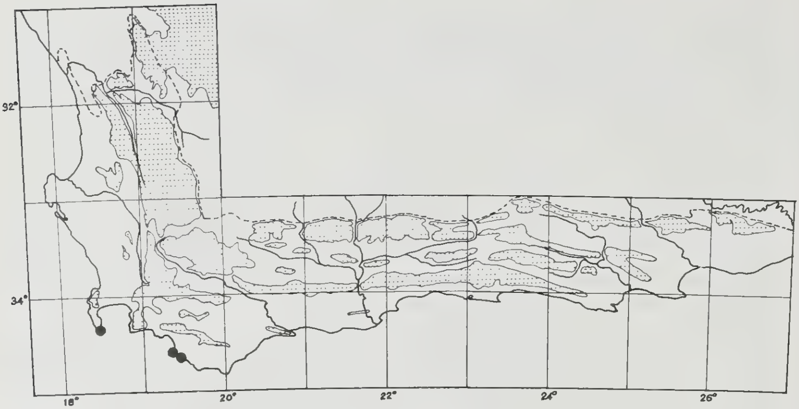

FIG. 22.
Diosma demissa: distribution.

ADDITIONAL SPECIMEN EXAMINED

CAPE—3418 (Simonstown): Cape Point Reserve, crest of small plateau, wind swept area along path at end of road between parking area and Cape McClear, Cape Peninsula (-AD), 200 ft. alt., 2/8/1978, *Esterhuysen 34974* (BOL).

26. Diosma apetala (Dümm.) Williams in Jl S. Afr. Bot. **40** 4: 278 (1974).

Acmadenia apetala Dümmer in Fedde Report. **11**: 121 (1912). Type: South Africa, on moist and stony mountain places near Vrolykheid, 1 200 –1 500 m, on the Great Zwartebergen, 3/8/1829, *Drège 2250* (K, holo.; G, P, isotypes).

Diosma bolusii Glover in Ann. Bol. Herb. **1**. 3: 26 (1915). Type: Cape Province: South West Region; on rocky slopes of the Zwartberg Mountains in the Zwartberg Pass, Prince Albert Div., *H. Bolus 11460* (BOL, holo.; PRE. iso.).

Icon: Glover loc. cit. **1**. 3. t. 15. f. c (1915).

Shrubs low, dense, spreading from a single stem at base; *branchlets* very short, erect-puberulous, densely foliate; *leaves* very small, lanceolate, triangular, sessile, appressed-erect, alternate with a row of gland dots along the midrib; *flowers* terminal, sessile, 1–2 nate, inconspicuous; petals five forming a cup which delpases as the flower opens; *disc* sinuate-crenulate, standing wide open, far exceeding the ovary.

SELECTED SPECIMENS EXAMINED

CAPE—3321 (Ladismith): Ladismith Div., West Klein Swartberg, Buffelsrivierpoort Mtns., 3 200 ft. (-AC), 26/4/1973, *Williams 1973* (NBG); Ladismith Div., S.

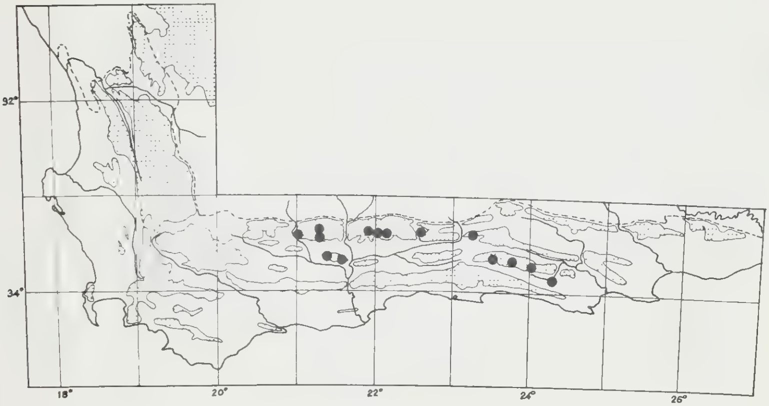

FIG. 23.
Diosma apetala: distribution.

Slopes of Swartberg below Toverkop, 3 500–4 000 ft. (-AC), 23/4/1951, *Esterhuysen 18551* (BOL); Klein Swartberg, lower S. slopes near Ladismith, 3 000 ft. (-AD), –/12/1928, *Andreae 1352* (BOL, PRE, STE); Laingsburg Div., N. slopes of Klein Swartberg, above Nietvoorby, 4 200 ft. (-AD), 25/4/1973, *Williams 1788* (NBG, PRE, STE); Prince Albert Div., 8 miles W. from the top of Swartberg Pass, 5 000 ft. (-BD), 20/11/1954, *Stokoe s.n.* (SAM); Ladismith Div., Bailey Peak, Rooiberg, N. slopes, 4 500 ft. (-CB), 3/11/1975, *Williams 2135* (NBG); Ladismith Div., stony S. slopes of Roodeberg (-DA), 20/5/1950, *Esterhuysen 17174* (BOL, PRE).
—3322 (Oudtshoorn): Prince Albert Div., in praecipitibus saxosis montium Zwartbergen ad Zwartberg pass, 4 800 ft. (-AC), –/12/1904, *H. Bolus 11460* (BOL, PRE); Oudtshoorn Div., Swartberg about 5 miles E. of pass (-AC), 29/1/1961, *Esterhuysen 28816* (BOL); Oudtshoorn Div., slopes above Meirings poort, N. aspect (-BC), 16/10/1955, *Esterhuysen 24844* (BOL); Prince Albert Div., Zwartbergen bui Vrolyk, 3 000–3 500 ft. (-BC), 3/8/1829, *Drège 2250* (K, G, P).
—3323 (Uniondale): Uniondale Div., Slypsteenberg S. slopes, 3 000–4 000 ft. (-AC/AD), 3/11/1941, *Esterhuysen 6308* (BOL); Uniondale Div., Kouga Mtns., Saptokop summit, 5 595 ft. (-DA), 23/11/1958, *Esterhuysen 27976* (BOL); Uniondale Div., Kouga Mtns., peak near Smutsberg, 4 000 ft. (-DB), 12/11/1944, *Esterhuysen 10873* (BOL).
—3324 (Steytlerville): Uniondale Div., Kouga Peak, rocky summit slopes, 4 500–5 600 ft. (-CA), 27/10/1949, *Esterhuysen 16263* (BOL); Humansdorp Div., along road from Zuuranys to Kouga (-CC), –/8/1942, *Fourcade 5649* (BOL-FOURC).

DISTRIBUTION

Diosma apetala is found growing at altitudes of from 900–1 700 m (3 000–5 600 ft.) above sea level in dry places on the Swartberg, Rooiberg and Kougaberg; a distance of about 300 km from west to east.

No significant variation has been observed.

Diosma apetala is recognised as distinct being the only species in which the petals, which form a cup over the flower in the bud stage, delapse before anthesis, their place then being taken by the pallid calyx lobes.

27. Diosma passerinoides Steud. in Flora **34**: 549 (1830). Type: Ruckenhohe circe 1 stande van Basson, 9/10/1826, *von Ludwig s.n.* (S, lectotype).

Diosma obtusifolia Sond. in Flor. Cap. **1**: 377 (1860). Type: *Drège 7114* (S).

Shrubs with several stems arising from a fairly stout rootstock, 300–400 mm tall, forming a dense bush with interlocking branches which may be associated with a tuft of grass. *Branches* short, variously bent, glabrous, leafless; *bark* dirty brown, fairly rough. *Branchlets* short, very numerous, fairly erect, slender, puberulous, well clothed but not hidden by the leaves. *Leaves* 2–3 mm long, 1–1,5 mm broad, elliptic, obtuse, sparsely scabrid-pubescent, sessile, erect, appressed at the base, spreading above, alternate, spirally 5-ranked; apex with a blunt callus; hyaline margins very narrow with very short spiky hairs; adaxial surface glabrous, flat when fresh; abaxial surface gland-dotted on both sides of the prominent midrib and on the margin. *Inflorescence* terminal, solitary, white. *Bract* leaf-like, 1,5 mm long, 0,8 mm broad, obtuse, minutely pubescent; margins narrow, ciliate below; apex callused. *Bracteoles* two, 1 mm long, 0,8 mm broad, sub-ovate, obtuse, callused, minutely and sparsely pubescent; apex thickened; margins minutely ciliolate. *Calyx lobes* five, 1,7 mm long, 1,4 mm broad, somewhat deltoid, thickened with a blunt apical callus, spreading and somewhat recurved above, adaxially very short-pubescent, abaxially glabrous. *Petals* five, 3 mm long, 2,2 mm broad, ovate or sub-orbicular, obtuse, glabrous, white. *Staminodes* five, vestigial, a round swelling on the disc about 0,15 mm diam., or a translucent sessile sphere. *Filaments* five, becoming 1,8 mm long, acicular, glabrous. *Anthers* five, before anthesis 1,3 mm long, 0,8 mm broad, wine-coloured with a semi-immersed gland at the apex, adaxially somewhat yellow. *Pollen* 47 μ long, 23 μ broad, oblong. *Disc* 5-sinuate, 5-crenulate, green fleshy, well developed, standing wide open. *Stigma* 0,3 mm diam., green, capitellate. *Style* at first deflexed, becoming 1 mm long, glabrous. *Ovary* 5-carpellate, 1 mm diam., glabrous, becoming reddened, apices globose. *Fruit* 5-carpellate, 6 mm long, 5 mm diam., glabrous, pitted with gland dots to a varying degree; *horns* 1,5 mm long, spreading. *Seed* 4,5 mm long, 1,8 mm broad, black, shining; aril streaked with black.

Whilst on a botanical tour in 1826, Baron von Ludwig and his companion Ludwig Beil collected this species near the farm of *Basson* at Zoutrivier in what is now known as the Bredasdorp District. Von Ludwig's specimen seen by Steudel has not been traced. (The herbarium at Stuttgart was dispersed during the 1939/45 war.). Fortunately a fragment about 90 mm long is preserved in Sonder's herbarium at Stockholm and this has been chosen as the lectotype. A specimen, collected at the same time and place by Beil, is preserved in the herbarium of the South African Museum at Kirstenbosch. The area where this plant was originally found has now been brought under cultivation and it is doubtful if any plants still survive there.

On the same sheet with *D. passerinoides* in Sonder's herbarium is a specimen *Drège 2250*. This is *Diosma apetala* (Dümmer) Williams. It has leaves with a single row of gland dots along both sides of the midrib and along both margins. It is quite clear from Sonder's interpretation (Fl. Cap. **2**: 377, 1860) of *D. passerinoides* that he regarded these two specimens to be conspecific. In fact Sonder's description appears to be based mainly upon the twig of *D. apetala*. One can understand that in describing his *D. obtusifolia* based upon *Drège 7114*, without locality, Sonder failed to notice that it was really conspecific with *D. passerinoides*.

The above description prepared from fresh material amplifies those previously given.

SPECIMENS EXAMINED

CAPE—3320 (Montagu): Potberg, west of Farm House, Bredasdorp Division (-BC), 500 ft. alt., 19/6/1979, *Williams 2771* (NBG); Baden hillsides (-CA), 24/9/1946, *Walgate s.n.* (BOL), *Lewis 1753* (SAM), *Compton 18413* (NBG).

—3322 (Oudtshoorn): Eensaamheid, Longkloof, George Division (-DD), 2 250/2 300 ft., 23/8/1975, *Williams 2048A* (NBG), 23/7/1973, *Esterhuysen 33212* (BOL); lower clayish slopes of Kamanassie Mtns. at Laudina, Uniondale Division (-DB), 9/11/1949, *Esterhuysen 16476* (BOL).

—3419 (Caledon): ad monte Swartberg (-AB), –/9/–, *Zeyher s.n.* (SAM); Onverwacht 19 miles W. of Riviersonderend (-BA), 900 ft., 29/8/1962, *Acocks 22661* (PRE).

—3420 (Bredasdorp): Ruckenhohe circa 1 stande van Basson (-AC), 9/10/1826, *von Ludwig s.n.* (S); in collibus apicis pone praedium Basson ad Zoutrivier –/10/–, *Beil s.n.* (SAM); Karsrivier van de Bruin bij Potberg, 9/8/1826, *Beil s.n.* (SAM); in collibus pr. Buffeljagsrivier, Swellendam Division (-BA), 800/1 200 ft., –/9/–, *Zeyher ? s.n.* (K); hills 1 km E. of Bredasdorp/Swellendam Road near Vrede (-AC/AD), 950 ft., 12/8/1973, *Williams 1840* (NBG, PRE, S, STE); roundabout Jantjiesbosch in the veld on the farm Nachtwacht, Bredasdorp Division (-CA), 150 ft., –/6/1927, *Smith 4285* (PRE); on farm Nachtwacht near the school, Bredasdorp Division, –/9/1926, *Smith 2970* (PRE).

—3421 (Riversdale): rocks on the Witteberg quartzite mass near Riversdale (-AB), 850 ft., 1/6/1924, *Muir 3087* (BOL, PRE); Riversdale commonage, –/7/1909, *Muir 409* (PRE); Oudetuin near Albertinia (-BA), –/5/1914, *Muir s.n.* (PRE).

Without locality: *Drège 7114* (S).

DISTRIBUTION AND VARIATION

Diosma passerinoides is found growing in dry clayish soils in some way associated with patches of silcrete, on the coastal plain from near Greyton and Bredasdorp in the west to Albertinia in the east with outliers behind the

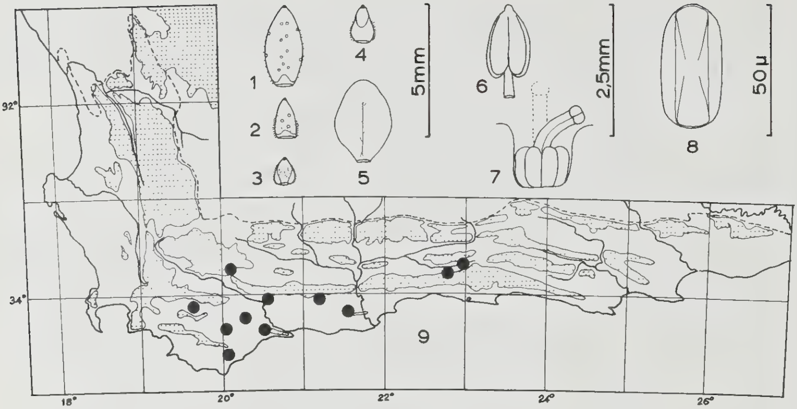

FIG. 24.
Diosma passerinoides: 1, leaf. 2, bract. 3, bracteole. 4, calyx lobe. 5, petal. 6, anther. 7, gynoecium. 8, pollen. 9, distribution.

mountains at Baden near Montagu and at Eensaamheid and Laudina near Uniondale. It is now extremely rare and very few plants are to be found.

The only variation that has been observed lies in the degree of pitting in the surface of the carpels of the mature fruits, those found near the Potberg being much more roughened than those found near Vrede on the Swellendam/Bredasdorp road.

Diosma passerinoides is recognised as distinct being a shrub up to 400 mm tall, branching from the base; with leaves elliptic, obtuse, minutely pubescent, sessile, erect, alternate with 4 rows of gland dots; with flowers solitary, terminal and with petals ovate, glabrous, narrowed to the base. It differs from *D. strumosa* which has the style and filaments sparsely and minutely pubescent.

28. Diosma strumosa Williams in Jl S. Afr. Bot. **45**.2: 180 (1979). Type: CAPE—3320 (Montagu): Soutkloof, 11 km north of the main road near Barrydale, Swellendam Division (-DC), 760 m alt., 28/6/1977, *Williams 2314* (NBG, holotype; BOL, K, L, M, MO, PRE, S, isotypes).

Diosma strumosa is recognised as distinct with its deeply pitted fruit, its long recurved petals, its wine-coloured anthers and disc and its style and filaments sparsely clothed with minute hairs.

PHYTOGEOGRAPHY

As can be seen from Figure 25 the main area of distribution of the fifteen

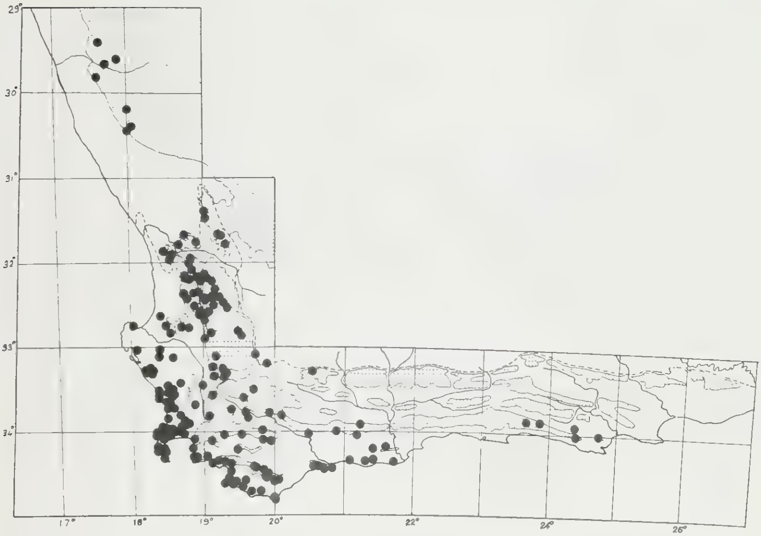

Fig. 25.
Distribution of species in Section *Diosma*.

species in the section *Diosma* lies to the west of a line drawn through Cape Agulhas and Laingsburg. Only two species are found eastwards of this line: *D. sabulosa*, the distribution of which lies wholly eastwards and extends as far as Albertinia and *D. hirsuta*, a species ubiquitous in the S.W. Cape which also extends along the mountains as far eastwards as Humansdorp with a very large disjunction from Riversdale to Joubertina. Two species are unusual in that their areas of distribution extend beyond the limits of the Cape Geological Series into Little Namaqualand. For these two species to have migrated to or from Little Namaqualand, leaving a disjunction of as much as 250 km in the case of *D. ramosissima,* conditions of climate and perhaps soil must have been very different from those found today.

Seed in the *Diosmeae* is known to be transported by ants (W. Bond, written communication) and to be projected from the capsule a short distance when ripe but no method of long distance transportation of seed has ever been suggested in these genera. Of the species in the section *Diosma* seven occur in mountainous areas as well as at lower levels and seven are found upon the coastal plain mostly fairly close to the sea.

Figure 26 shows the collection localities of all thirteen species in the section *Tumella*. As can be seen this forms an east-west pattern falling entirely

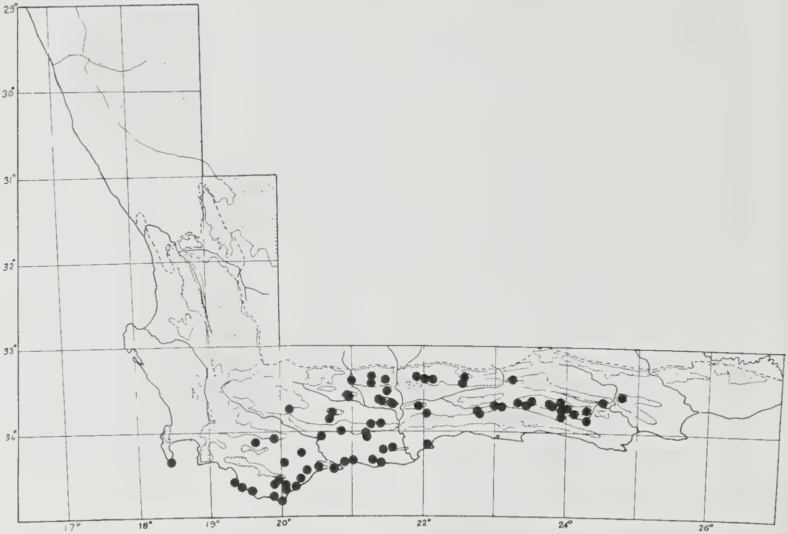

FIG. 26.
Distribution of species in Section *Tumella*.

within the folded belt of the Cape Geological Series and terminating in the west approximately at a line drawn from Danger Point to Laingsburg. The difference in distribution between the two sections *Diosma* and *Tumella* is significant. A similar pattern was observed in the study of the genus *Leucadendron* (Williams, 1972) where the distribution of species was correlated with rainfall areas.

In the case of the genus *Diosma* species in the section *Diosma* are found almost entirely in the so-called *winter rainfall* zone and those in the section *Tumella* in the *non-seasonal rainfall* zone. In the section *Tumella* four species are found growing upon the limestone formations of the Bredasdorp beds. No species in the section *Diosma* occur upon limestone but four species are found growing in sandy ground nearby or associated with the limestone deposits in almost parallel situations. Going from west to east these species are in the section *Diosma: D. subulata, D. awilana, D. arenicola* and *D. sabulosa* and in the section *Tumella: D. demissa, D. haelkraalensis, D. guthriei* and *D. echinulata*.

Within the genus as a whole ten species may be said to be widespread or common, nine species fairly localised, eight species rather rare and one species may be extinct as it has only been collected once.

Species Imperfectly Known

(1). *Diosma cordata* Mart., Diss. Hort. Erlang.: 67 (1814).

(2). *Diosma cordata* Wender. in Schrift. Ges. Bef. Gesammt. Naturw. Marb. **2**: 248 (1831)—Hort.

(3). *Diosma filiformis* Hort. ex Colla, Herb. Pedem. **1**: 552 (1833).

(4). *Diosma grandiflora* Burm. f., Flor. Cap. Prodr.: 6 (1768).

(5). *Diosma lanceolata* Wender, in Schrift. Ges. Bef. Gesammt. Naturw. Marb. **2**: 248 (1831)—Hort.

(6). *Diosma plumosa* Colla., Herb. Pedem. **1**: 552 (1833)—Type: A sterile fragment received from "Perret" (TO).

Species Excluded

1. *Diosma abietina* D. Dietr., Synops. Plant. **1**: 829 (1839).
   Euchaetis abietina Eckl. & Zeyh., Enum. Plant.: 104 (1835).

This is *Euchaetis glomerata* Bartl. & Wendl.

2. *Diosma acerosa* (Eckl. & Zeyh.) D. Dietr., Synops. Plant. **1**: 826 (1839).

This is *Agathosma bisulca* Bartl. & Wendl.

3. *Diosma acuminata* DC. Prodr. **1**: 715 (1824).
   Bucco acuminata Wendl. Collect. **1**. t. 28 (1805).
   Agathosma acuminata Willd., Enum. Plant.: 260 (1809).

This is *Agathosma imbricata* (L.) Willd.

4. *Diosma acuminata* Lodd., Bot. Cab. t. 493 (1821).
   Adenandra acuminata (Lodd.) Sweet, Hort. Brit. ed. **1**: 88 (1826).

This is *Adenandra villosa* (Berg.) Licht. ex Roem. & Schult.

5. *Diosma acuta* Lee, ex Bartl. & Wendl., Diosm. in Beitr. Bot. **1**: 182 (1824)—nom. nud.
6. *Diosma adenocaulis* (Eckl. & Zeyh.) D. Dietr., Synops. Plant. **1**: 826 (1839).

This is *Agathosma hirta* Bartl. & Wendl.

7. *Diosma alba* Thunb., Prodr. Plant. Cap. **1**: 84 (1794).

This is *Coleonema album* (Thunb.) Bartl. & Wendl.

8. *Diosma alpina* D. Dietr., Synops. Plant. **1**: 828 (1839).
   Barosma alpina Eckl. & Zeyh., Enum. Plant.: 102 (1835).

This is *Agathosma odoratissima* (Mont.) Pillans

9. *Diosma ambigua* Lodd., Bot. Cab. t. 461 (1820).

This is *Agathosma ciliata* Link

10. *Diosma amoena* Lodd., Bot. Cab. t. 161 (1818).

This is *Adenandra villosa* (Berg.) Licht. ex. Roem. & Schult. ssp. *orbicularis* Strid.

11. *Diosma angustifolia* Hook. in Curt. Bot. Mag. sub. t. 3340 (1834)—nom. nud.

This is *Coleonema pulchrum* Hook.

12. *Diosma apicuata* Spreng., Syst. Veg. **1**: 787 (1825).

This is *Agathosma apiculata* G. F. W. Mey. ex Bartl. & Wendl., Diosm. in Beitr. Bot. **1**: 176 (1824).

13. *Diosma asiatica* Lour. Fl. Cochinch. **1**: 161 (=Pseudiosma ?)—Cochinchina.
14. *Diosma asperifolia* (Eckl. & Zeyh.) D. Dietr., Synops. Plant. **1**: 825 (1839).

This is *Agathosma asperifolia* Eckl. & Zeyh.

15. *Diosma aulonophila* (Eckl. & Zeyh.) D. Dietr., Synops. Plant. **1**: 826 (1839).

This is *Agathosma virgata* Bartl. & Wendl.

16. *Diosma barbata* Berg. Herb. ex. Sond. in Flor. Cap. **1**: 439 (1860)—nom. nud.
17. *Diosma barbata* (Spreng.) DC., Prodr. **1**: 715 (1824).
    Agathosma barbatum Spreng., Pugill. **1**: 20 (1813).

Most certainly not *Diosma*.

18. *Diosma barbigera* Linn. f., Suppl. Plant.: 155 (1781).

This is *Macrostylis barbigera* (Linn. f.) Bartl. & Wendl.

19. *Diosma barosmaefolia* (Eckl. & Zeyh.) D. Dietr., Synops. Plant. **1**: 825 (1839).

This is *Agathosma bisulca* Bartl. & Wendl.

20. *Diosma berzeliaefolia* (Eckl. & Zeyh.) D. Dietr., Synops. Plant. **1**: 827 (1839).

This is *Agathosma virgata* Bartl. & Wendl.

21. *Diosma betulina* Lam. Encycl. Meth. Bot. **2**: 288 (1786).

This is *Agathosma odoratissima* (Mont.) Pillans

22. *Diosma betulina* Thunb., Prodr. Plant.: 43 (1794).
    Hartogia betulina Berg., Plant. Cap.: 67 (1767).

This is *Agathosma betulina* (Berg.) Pillans

23. *Diosma bifida* Jacq., Coll. **3**: 278 (1789).

This is *Agathosma bifida* (Jacq.) Bartl. & Wendl.

24. *Diosma bifurca* (typographical error) Willd., Sp. Pl. **1**: 1136 (1798).

This is *Agathosma bisulca* (Thunb.) Bartl. & Wendl.

25. *Diosma biophylla* (Eckl. & Zeyh.) D. Dietr., Synops. Plant. **1**: 825 (1839).

This is *Agathosma hirta* Bartl. & Wendl.

26. *Diosma biseriata* (Mey. ex Bartl. & Wendl.) Spreng., Syst. Veg. **1**: 784 (1825).
    Adenandra biseriata G. F. W. Meyer ex Bartl. & Wendl., Diosmeae in Beitr. Bot. **1**: 75 (1824).

This is *Adenandra villosa* (Berg.) Licht. ex Roem. & Schult. ssp. *biseriata* (Mey. ex Bartl. & Wendl.) Strid.

27. *Diosma bisulca* Thunb., Prod. Plant, Cap.: 84 (1794).

This is *Agathosma bisulca* (Thunb.) Bartl. & Wendl.

28. *Diosma brachyphylla* (Schld.) D. Dietr., Synops. Plant. **1**: 828 (1839).

This is *Adenandra brachyphylla* Schld.

29. *Diosma brevifolia* Lam., Encycl. Meth. Bot. **2**: 285 (1786).

This is *Agathosma capensis* (L.) Dümmer

30. *Diosma bruniades* Link, Enum. Hort. Berol. **1**: 237 (1821).

This is *Agathosma serpyllacea* (Licht. ex Roem. & Schult.) Bartl. & Wendl.

31. *Diosma calycina* Steud. in Flora **13**: 549 (1830).

This is *Coleonema calycinum* (Steud.) Williams

32. *Diosma calycina* Tausch in Flora **13**: 554 (1830).

This is *Adenandra villosa* ssp. *sonderi* (Dümmer) Strid.

33. *Diosma capensis* Ait. Hort. Kew. **3**: 488 (1789).
    Hartogia capensis L., Syst. Nat. ed. 10, **2**: 939 (1759).

This is *Agathosma capensis* (L.) Dümmer

34. *Diosma capensis* L., Mant. **2**: 343 (1771).
    Hartogia capensis L., Sp. Pl. ed. 3, **1**: 288 (1764).

This is some species of *Agathosma*.

35. *Diosma capita* L. Mant. **2**: 210 (1771).

This is *Audouinia capitata* (L.) Brongn.

36. *Diosma capitata* Dumont de Cours, Bot. Cult. ed. 2. **5**: 405 (1811).

This is *Agathosma ciliata* Link

37. *Diosma cerefolia* Vent., Jard. Malm.: 93 (1804).
This is *Agathosma cerefolium* (Vent.) Bartl. & Wendl.
38. *Diosma chortophila* (Eckl. & Zeyh.) D. Dietr., Synops. Plant. **1**: 827 (1839).
This is *Agathosma capensis* (L.) Dümmer
39. *Diosma ciliata* Lam., Encycl. Meth. Bot. **2**: 287 (1786).
This is *Agathosma ciliaris* (L.) Druce
40. *Diosma ciliata* L., Sp. pl. **1**: 198 (1753).
This is *Agathosma ciliata* Link
41. *Diosma ciliata* Thunb., Prodr. Plant. Cap.: 43 (1794).
This is *Agathosma capensis* (L.) Dümmer
42. *Diosma cistoides* Lam., Encycl. Meth. Bot. **2**: 289 (1786).
This is a species of *Adenandra.*
43. *Diosma collina* (Eckl. & Zeyh.) D. Dietr., Synops. Plant. **1**: 825 (1839).
This is *Agathosma collina* Eckl. & Zeyh.
44. *Diosma cordata* Mart., Enum. Hort. Erlang.: 67 (1814) = *Agathosma imbricata* ?
45. *Diosma coriacea* DC., Prodr. **1**: 713 (1824).
This is *Adenandra coriacea* Licht. ex Roem. & Schult.
46. *Diosma corymbosa* Montin, in Phys. Sallsk. Handl. **1**: 106 (1776).
This is *Agathosma corymbosa* (Mont.) G. Don, Gen. Syst. **1**: 789 (1831).
47. *Diosma crenata* L., Syst. nat. ed. 10, **2**: 940 (1759).
This is *Agathosma crenulata* (L.) Pillans
48. *Diosma crenata* Lodd., Bot. Cab. **51.** t. 404 (1820).
This is *Agathosma betulina* (Berg.) Pillans
49. *Diosma crenulata* L., Cent. Plant. **2**: 11 (1755).
This is *Agathosma crenulata* (L.) Pillans
50. *Diosma cupressina* L., Mant.: 50 (1767).
This is most probably *Thamnia uniflora* Soland ex Brongn.
51. *Diosma cuspidata* Thunb. in Hoffm. Phytogr. Blaett., **1**: 24 (1803).
This is *Linconia cuspidata* (Thunb.) Swartz
52. *Diosma cuspidata* Spreng. Syst. Veg. **1**: 785 (1825).
This is *Adenandra villosa* (Berg.) Licht. ex Roem. & Schult.
53. *Diosma cuspidata* (Bartl. & Wendl.) D. Dietr., Synops. Plant. **1**: 826 (1839).
This is *Agathosma serpyllacea* (Licht. ex Roem. & Schult.) Bartl. & Wendl.
54. *Diosma cyminoides* (Eckl. & Zeyh.) D. Dietr., Synops. Plant. **1**: 827 (1839).
This is *Agathosma capensis* (L.) Dümmer
55. *Diosma decumbens* (Eckl. & Zeyh.) D. Dietr., Synops. Plant. **1**: 827 (1839).
This is *Agathosma capensis* (L.) Dümmer
56. *Diosma deflexa* Desf. in Steud. Nom. Bot. **1**: 512 (1841) = *Agathosma deflexa*, an unknown species.
57. *Diosma deusta* Thunb. in Hoffm. Phytogr. Blaett. **1**: 25 (1803).
This is *Linconia deusta* (Thunb.) Pillans
58. *Diosma dioica* Ker-Gawl. in Edwards' Bot. Reg. t. 502 (1820).
This is *Agathosma ovata* (Thunb.) Pillans
59. *Diosma dubia* Spreng. ex Steud. in Flora **13**: 548 (1830).
This is *Agathosma puberula* (Steud.) Fourcade
60. *Diosma eckloniana* (Schldl.) D. Dietr., Synops. Plant. **1**: 826 (1839).
This is *Agathosma serpyllacea* (Licht. ex Roem. & Schult.) Bartl. & Wendl.
61. *Diosma elata* (Eckl. & Zeyh.) D. Dietr., Synops. Plant. **1**: 829 (1839).
This is *Euchaetis elata* Eckl. & Zeyh.

62. *Diosma ensata* Thunb., Prod. Plant. Cap.: 43 (1794).
This is *Empleurum unicapsulare* (L.f.) Skeels
63. *Diosma erecta* (Wendl.) DC. Prodr. **1**: 715 (1824).
This is *Agathosma capensis* (L.) Dümmer
64. *Diosma eriantha* Steud. in Flora **13**: 550 (1830).
This is *Agathosma eriantha* (Steud.) Steud.
65. *Diosma fastigiata* (Eckl. & Zeyh.) D. Dietr., Synops. Plant. **1**: 827 (1839).
This is *Agathosma capensis* (L.) Dümmer
66. *Diosma ferulacea* Hort. Kew. ex Sond. in Flor. Cap. **1**: 376 (1860)—nom. nud.
This is *Acmadenia teretifolia* (Link) Phillips
67. *Diosma filipetala* (Eckl. & Zeyh.) D. Dietr., Synops. Plant. **1**: 826 (1839).
This is *Agathosma stenopetala* (Steud.) Steud.
68. *Diosma flaccida* (Eckl. & Zeyh.) D. Dietr., Synops. Plant. **1**: 827 (1839).
This is *Acmadenia flaccida* Eckl. & Zeyh.
69. *Diosma flexilis* (Eckl. & Zeyh.) D. Dietr., Synops. Plant. **1**: 829 (1839).
This is *Euchaetis flexilis* Eckl. & Zeyh.
70. *Diosma foetidissima* (Bartl. & Wendl.) Spreng. Syst. Veg. **1**: 785 (1825).
This is *Agathosma foetidissima* Hortul. ex Steud.
71. *Diosma fragrans* Sims, Bot. Mag. t. 1519 (1813).
This is *Adenandra fragrans* (Sims) Roem. & Schult.
72. *Diosma geminifolia* (Eckl. & Zeyh.) D. Dietr., Synops. Plant. **1**: 826 (1839).
This is *Agathosma capensis* (L.) Dümmer
73. *Diosma glabra* (Eckl. & Zeyh.) D. Dietr., Synops. Plant. **1**: 827 (1839).
This is *Agathosma serpyllacea* (Licht. ex Roem. & Schult.) Bartl. & Wendl.
74. *Diosma glandulosa* Hort. ex Bartl. & Wendl., Diosm. in Beitr. Bot. **1**: 110 (1824).
This is *Agathosma ovata* (Thunb.) Pillans
75. *Diosma glandulosa* Thunb., Diss. Diosm.: 386 (1797).
This is *Agathosma glandulosa* Sond.
76. *Diosma glauca* (Eckl. & Zeyh.) D. Dietr., Synops. Plant. **1**: 825 (1839).
This is *Agathosma bisulca* Bartl. & Wendl.
77. *Diosma glomerata* G. F. W. Mey. ex Bartl. & Wendl., Diosm. in Beitr. Bot **1**: 16 (1824)—nom. nud.
This is *Euchaetis glomerata* Bartl. & Wendl.
78. *Diosma gnidioides* D. Dietr., Synops. Plant. **1**: 829 (1839).
Agathosma gnidioides Schldl. in Linnaea **6**: 206 (1831).
This is *Agathosma puberula* (Steud.) Fourcade
79. *Diosma gonaquensis* (Eckl. & Zeyh.) D. Dietr., Synops. Plant. **1**: 825 (1839).
This is *Agathosma gonaquensis* Eckl. & Zeyh.
80. *Diosma gracilis* (Eckl. & Zeyh.) D. Dietr., Synops. Plant. **1**: 828 (1839).
This is *Adenandra gracilis* Eckl. & Zeyh.
81. *Diosma graveolens* Licht. ex Roem. & Schult., Syst. Veg. **5**: 461 (1819).
This is *Agathosma ovata* (Thunb.) Pillans
82. *Diosma hirta* Lam., Encycl. Meth. Bot. **2**: 286 (1786).
This is *Agathosma hirta* (Lam.) Bartl. & Wendl.
83. *Diosma hirta* Vent., Jard. Malm. t. 72 (1803).
This is *Agathosma corymbosa* (Mont.) G. Don
84. *Diosma hispida* Hort. Angl. ex Bartl. & Wendl., Diosm. in Beitr. Bot. **1**: 159 (1824)—nom. nud.
This is *Agathosma cerefolium* (Vent.) Bartl. & Wendl.

85. *Diosma hispida* Hort. ex Bartl. & Wendl., Diosm. in Beitr. Bot. **1**: 183 (1824)—nom. nud.
This is *Agathosma serpyllacea* (Licht. ex Roem. & Schult.) Bartl. & Wendl.
86. *Diosma hispida* Thunb., Prodr.: 42 (1794).
This is *Agathosma hispida* (Thunb.) Bartl. & Wendl.
87. *Diosma humilis* (Eckl. & Zeyh.) D. Dietr., Synops. Plant. **1** : 828 (1839).
Adenandra humilis Eckl. & Zeyh., Enum. Plant.: 99 (1836).
This is *Adenandra marginata* (L.f.) Roem. & Schult.
88. *Diosma hybrida* Hort. Angl. ex Bartl. & Wendl., Diosm. in Beitr. Bot. **1**: 167 (1824)—nom nud.
Agathosma hybrida Bartl. & Wendl. loc. cit.
This is *Agathosma ciliaris* (L.) Druce
89. *Diosma hybrida* Spreng. Syst. Veg. **1**: 787 (1825).
This is a species of *Agathosma*
90. *Diosma hyponeura* (Eckl. & Zeyh.) D. Dietr., Synops. Plant. **1**: 826 (1839).
This is *Agathosma serpyllacea* (Licht. ex Roem. & Schult.) Bartl. & Wendl.
91. *Diosma imbricata* L. Syst. Veg. ed. 14,: 239 (1784).
This is *Agathosma imbricata* (L.) Willd.
92. *Diosma imbricatum* Dumont de Cours. Bot. Cult. ed. 2. **5**: 405 (1811).
This is *Audouinia capitata* Brongn.
93. *Diosma intermedia* (Eckl. & Zeyh.) D. Dietr., Synops. Plant. **1**: 828 (1839).
Adenandra intermedia Eckl. & Zeyh., Enum. Plant.: 99 (1835).
This is *Adenandra marginata* (L.f.) Roem. & Schult.
94. *Diosma involucrata* (Eckl. & Zeyh.) D. Dietr., Synops. Plant. **1**: 825 (1839).
This is *Agathosma involucrata* Eckl. & Zeyh.
95. *Diosma joubertiana* (Schldl.) D. Dietr., Synops. Plant. **1**: 825 (1839).
This is *Agathosma joubertiana* Schldl.
96. *Diosma juniperina* (Bartl. & Wendl.) Spreng. Syst. Veg. **1**: 784 (1825).
Acmadenia juniperina Bartl. & Wendl., Diosm. in Beitr. Bot. **1**: 61 (1824).
This is *Acmadenia obtusata* (Thunb.) Bartl. & Wendl.
97. *Diosma juniperina* Moench, Meth. Plant. Hort. Marb.—Suppl.: 26 (1802).
This is *Coleonema album* (Thunb.) Bartl. & Wendl.
98. *Diosma laevigata* (Bartl. & Wendl.) Spreng., Syst. Veg. **1**: 784 (1825).
Acmadenia laevigata Bartl. & Wendl., Diosm in Beitr. Bot. **1**: 64 (1824).
This is *Euchaetis meridionalis* Williams
99. *Diosma lanceolata* Ker-Gawl. in Edwards', Bot. Reg. t. 476 (1820).
This is *Agathosma ciliaris* (L.) Druce
100. *Diosma lanceolata* L., Mant. Alt.: 343 (1771).
This is *Agathosma lanceolata* (L.) Engl.
101. *Diosma lanceolata* Thunb., Prodr. Plant. Cap.: 43 (1794).
This is *Agathosma ovata* (Thunb.) Pillans
102. *Diosma lancifolia* Schmidt, Neue u. Selt. Pfl.: 37 (1793).
This is *Agathosma capensis* (L.) Dümmer
103. *Diosma lasiophylla* Spreng., Syst. Veg. **1**: 787 (1825).
This is *Agathosma corymbosa* (Mont.) G. Don
104. *Diosma latifolia* Andr., Bot. Rep. t. 33 (1797).
This is *Agathosma crenulata* (L.) Pillans
105. *Diosma latifolia* L. f., Suppl.: 154 (1781).
This is *Agathosma odoratissima* (Mont.) Pillans
106. *Diosma laxa* Spreng., Syst. Veg. **1**: 787 (1825).
This is *Agathosma corymbosa* (Mont.) G. Don

107. *Diosma lediformis* (Eckl. & Zeyh.) D. Dietr., Synops. Plant. **1**: 824 (1839).
This is *Agathosma bifida* (Jacq.) Bartl. & Wendl.

108. *Diosma leiophylla* Spreng., Syst. Veg. **1**: 787 (1825).
This is *Agathosma glabrata* Bartl. & Wendl.

109. *Diosma lichtensteiniana* D. Dietr., Synops. Plant. **1**: 828 (1839).
This is *Adenandra villosa* (Berg.) Licht. ex Roem. & Schult.

110. *Diosma linearis* Thunb., Prod. Plant. Cap.: 43 (1794).
This is *Adenandra uniflora* (L.) Willd.

111. *Diosma linifolia* DC., Prodr. **1**: 715 (1824).
This is *Agathosma linifolia* Licht. ex Bartl. & Wendl.

112. *Diosma linifolia* Lodd. Bot. Cab. **4**. t. 400 (1819).
This is *Agathosma ovata* (Thunb.) Pillans

113. *Diosma lycopodioides* Willd. ex Roem. & Schult., Syst. Veg. **5**: 461 (1819).
This is *Agathosma imbricata* (L.) Willd.

114. *Diosma marginata* L. f., Suppl.: 155 (1781).
This is *Agathosma marginata* (L.f.) Roem. & Schult.

115. *Diosma marifolia* (Eckl. & Zeyh.) D. Dietr., Synops. Plant. **1**: 826 (1839).
This is *Agathosma marifolia* Eckl. & Zeyh.

116. *Diosma marlothii* Dümmer in Ann. Bol. Herb. **3**: 1 (1920).
This is *Acmadenia matroosbergensis* Phillips

117. *Diosma meyeri* D. Dietr. Synops. Plant. **1**: 828 (1839).
This is *Adenandra villosa* (Berg.) Licht. ex Roem. & Schult.

118. *Diosma micropylla* (Bartl. & Wendl.) Spreng., Syst. Veg. **1**: 787 (1825). *Agathosma microphylla* G. F. W. Mey. ex Bartl. & Wendl. Diosm in Beitr. Bot. **1**: 173 (1824).
This is *Agathosma cerefolium* (Vent.) Bartl. & Wendl.

119. *Diosma mixta* Hort. Kew. ex Bartl. & Wendl. Diosm. in Beitr. Bot. **1**: 182 (1824)—nom. nud.
This is *Agathosma serpyllacea* (Licht. ex Roem. & Schult.) Bartl. & Wendl.

120. *Diosma mollis* (Bartl. & Wendl.) D. Dietr., Synops. Plant. **1**: 825 (1839).
This is *Agathosma ciliaris* (L.) Druce

121. *Diosma montana* (Schldt.) D. Dietr., Synops. Plant. **1**: 825 (1839).
This is *Agathosma bifida* (Jacq.) Bartl. & Wendl.

122. *Diosma mundiaefolia* (Eckl. & Zeyh.) D. Dietr., Synops. Plant. **1**: 828 (1839).
This is *Adenandra mundiifolia* Eckl. & Zeyh.

123. *Diosma mundiana* (Eckl. & Zeyh.) D. Dietr., Synops. Plant. **1**: 827 (1839).
This is *Acmadenia mundiana* Eckl. & Zeyh.

124. *Diosma muraltioides* (Eckl. & Zeyh.) D. Dietr., Synops. Plant. **1**: 828 (1839).
This is *Acmadenia obtusata* (Thunb.) Bartl. & Wendl.

125. *Diosma myrsinites* Lam., Tabl. Encycl. Meth. Bot. **2**: 82 (1823).
This is *Agathosma ciliata* (L.) Link

126. *Diosma myrtifolia* Hort. Angl. ex Bartl. & Wendl., Diosm. in Beitr. Bot. **1**: 156 (1824)—nom. nud.
This is *Agathosma ciliata* (L.) Link

127. *Diosma nigra* (Eckl. & Zeyh.) D. Dietr., Synops. Plant. **1**: 827 (1839).
This is *Agathosma capensis* (L.) Dümmer

128. *Diosma nigromontana* (Eckl. & Zeyh.) D. Dietr., Synops. Plant. **1.** 825 (1839).

This is *Agathosma bifida* (Jacq.) Bartl. & Wendl.

129. *Diosma nodosa* (Thunb.) D. Dietr. Synops. Plant. **1**: 827 (1839).

This is *Agathosma virgata* Bartl. & Wendl. fide Steud. Nom. Bot.: 512 (1841).

130. *Diosma oblonga* Thunb. in Hoffm. Phytogr. Blaetter, **1**: 23 (1803).

This is *Agathosma ovata* (Thunb.) Pillans

131. *Diosma obtusa* (Wendl.) DC., Prodr. **1**: 714 (1824).
Bucco obtusa Wendl. Coll. **1**: 45 (1805).

This is *Agathosma ciliaris* (L.) Druce

132. *Diosma obtusa* G. F. W. Mey. in Bartl. & Wendl., Diosm. in Beitr. Bot. **1**: 197 (1824)—nom. nud.

This is *Macrostylis squarrosa* Bartl. & Wendl.

133. *Diosma obtusata* Thunb., Prodr. Plant. Cap.: 84 (1794).

This is *Acmadenia obtusata* (Thunb.) Bartl. & Wendl.

134. *Diosma odorata* (Wendl.) DC., Prodr. **1**: 714 (1824).
Parapetalifera odorata Wendl., Coll. **1**: 50, t. 15 (1805).

This is *Agathosma crenulata* (L.) Pillans

135. *Diosma odoratissima* Montin, in Phys. Sallsk. Handl. **1**: 104 (1776).

This is *Agathosma odoratissima* (Mont.) Pillans

136. *Diosma orbicularis* Hortul. ex Bartl. & Wendl., Diosm. in Beitr. Bot. **1**: 110 (1824)—nom. nud.

This is *Agathosma ovata* (Thunb.) Pillans

137. *Diosma orbicularis* Thunb., Prodr. Plant. Cap.: 84 (1794).

This is *Agathosma orbicularis* (Thunb.) Bartl. & Wendl.

138. *Diosma ovata* Thunb., Prodr. Plant. Cap.: 43 (1794)—p.p. There are two species here in Herb. Thunberg.
a. *Agathosma ovata* (Thunb.) Pillans
b. *Adenandra villosa* (Berg.) Licht. ex Roem. & Schult. ssp. *sonderi* (Dümmer) Strid

139. *Diosma ovata* Lodd. Cat. Plant.: 14 (1818) in Lodd. Bot. Cab. **2** (1818)—nom. nud.?

140. *Diosma parviflora* Willd. ex Roem. & Schult., Syst. Veg. **5**: 462 (1819).

This is *Agathosma virgata* (Lam.) Bartl. & Wendl.

141. *Diosma patentissima* (Eckl. & Zeyh.) D. Dietr., Synops. Plant. **1**: 826 (1839).

This is *Agathosma virgata* (Lam.) Bartl. &Wendl.

142. *Diosma patula* Spreng., Syst. Veg. **1**: 786 (1825).
Agathosma patula G. F. W. Mey. ex Bartl. & Wendl., Diosm. in Beitr. Bot. **1**: 134 (1824).

This is *Agathosma capensis* (L.) Dümmer

143. *Diosma pauciflora* (Eckl. & Zeyh.) D. Dietr., Synops. Plant. **1**: 829 (1839).
Barosma pauciflora Eckl. & Zeyh., Enum. Plant.: 103 (1835).

This is *Agathosma ovata* (Thunb.) Pillans

144. *Diosma perforata* Lam., Tabl. Encycl. Meth. Bot. **2**: 82 (1797).
Agathosma perforata (Lam.) G. Don, Gard. & Bot. **1**: 789 (1831

This is a species of *Agathosma*.

145. *Diosma pilifera* Steud. in Flora **13**: 549 (1830).

This is *Agathosma pilifera* (Steud.) Schldl. in Linnaea **6**: 206 (1830).

146. *Diosma platypetala* (Eckl. & Zeyh.) D. Dietr., Synops. Plant. **1**: 82 (1839).

This is *Agathosma capensis* (L.) Dümmer

147. *Diosma prolifera* (Wendl.) DC., Prodr. **1**: 718 (1824).
Bucco prolifera Wendl. Collect. **3**: 9, t. 77 (1811).

This is *Agathosma prolifera* (Wendl.) Bartl. & Wendl, a species imperfectly known.

148. *Diosma puberula* Steud. in Flora **13**: 548 (1830).

This is *Agathosma puberula* (Steud.) Fourcade

149. *Diosma pubescens* Thunb., Prodr.: 43 (1794).

This is *Agathosma corymbosa* (Mont.) G. Don

150. *Diosma pulchella* Houtt., Nat. Hist. **2**. 4: 328 (1775).

This is *Agathosma ovata* (Thunb.) Pillans

151. *Diosma pulchella* L., Sp. pl. **2**: 288 (1762).

This is *Agathosma pulchella* (L.) Link

152. *Diosma punctata* Licht. ex Roem. & Schult., Syst. Veg. **5**: 461 (1819).

This is *Agathosma ovata* (Thunb.) Pillans

153. *Diosma pungens* (Bartl. & Wendl.) Spreng., Syst. Veg. **1**: 784 (1825).

This is *Euchaetis pungens* (Bartl. & Wendl.) Williams

154. *Diosma purpurea* Desf., Tabl. **2**: 180 (1815).

This is *Agathosma corymbosa* (Mont.) G. Don

155. *Diosma purpurea* Hort. ex Bartl. & Wendl., Diosm. in Beitr. Bot. **1**: 163 (1824).

This is *Agathosma corymbosa* (Mont.) G. Don

156. *Diosma reflexa* Lodd. ex DC., Prodr. **1**: 716 (1819).
Diosma reflexa Lodd, Cat. Plant.: 14 (1818) in Lodd. Bot. Cab. **2** (1818)—nom. nud.

This is *Agathosma reflexa* Link, a species imperfectly known.

157. *Diosma reflexa* Soland. ex Sond. in Flor. Cap. **1**: 419 (1860).

This is *Agathosma imbricata* (L.) Willd.

158. *Diosma robusta* (Eckl. & Zeyh.) D. Dietr., Synops. Plant. **1**: 825 (1839).

This is *Agathosma robusta* Eckl. & Zeyh.

159. *Diosma rosmarinifolia* Lam., Encycl. Meth. Bot. **2**: 286 (1786).

This is *Adenandra marginata* (L.f.) Roem. & Schult. fide Sonder

160. *Diosma rotundifolia* (Eckl. & Zeyh.) D. Dietr., Synops. Plant. **1**: 828 (1839).

This is *Adenandra rotundifolia* Eckl. & Zeyh.

161. *Diosma rubra* L., Sp. pl. **1**: 198 (1753) ex parte

There are two species on the sheets at LINN—*Diosma hirsuta* L. and *Coleonema album* (Thunb.) Bartl. & Wendl.

162. *Diosma rubra* L. sensu Berg., Plant. Cap.: 62 (1767).

This is *Coleonema album* (Thunb.) Bartl. & Wendl.

163. *Diosma rubra* Hort. ex Bartl. & Wendl., Diosm. in Beitr. Bot. **1**: 163 (1824)—nom. nud.

This is *Agathosma villosá* Willd.

164. *Diosma rufescens* Spreng., Syst. Veg. **1**: 787 (1825).

This is *Agathosma refescens* (Spreng.) D. Don, an imperfectly known species.

165. *Diosma rugosa* Donn, Hort. Cantabr. ex Bartl. & Wendl., Diosm. in Beitr. Bot. **1**: 81 (1824) nom. nud.

This is *Adenandra villosa* (Berg.) Licht. ex Roem. & Schult.

166. *Diosma rugosa* Hort. Angl. ex Bartl. & Wendl., Diosm. in Beitr. Bot. **1**: 62 (1824)—nom. nud.

This is *Agathosma corymbosa* (Mont.) G. Don

167. *Diosma rugosa* Thunb., Prodr. Plant. Cap.: 43 (1794).

This is *Agathosma ciliaris* (L.) Druce

168. *Diosma schlechtendaliana* (Eckl. & Zeyh.) D. Dietr., Synops. Plant. **1**: 825 (1839).
This is *Agathosma eriantha* (Steud.) Steud.
169. *Diosma schmidtiana* Tausch. in Flora **13**: 553 (1830).
This is *Adenandra villosa* (Berg.) Licht. ex Roem. & Schult.
170. *Diosma scoparia* (Eckl. & Zeyh.) D. Dietr., Synops. Plant. **1**: 829 (1839).
Barosma scoparia Eckl. & Zeyh., Enum. Plant.: 103 (1835).
This is *Agathosma ovata* (Thunb.) Pillans
171. *Diosma sedifolia* (Schlechtendal) D. Dietr., Synops. Plant. **1**: 825 (1839).
This is *Agathosma sedifolia* Schlechtendal
172. *Diosma serpyllacea* (Licht. ex Roem. & Schult.) DC., Prodr. **1**: 715 (1824).
Bucco serpyllacea Licht. ex Roem. & Schult., Syst. Veg. **5**: 447 (1819).
This is *Agathosma serpyllacea* (Licht. ex Roem & Schult.) Bartl. & Wendl.
173. *Diosma serrata* Blanco, Flor. Filip. **1**: 168 (1873).
This is *Celastrus paniculatus* Willd.
174. *Diosma serratifolia* Curt., Bot. Mag.: 456 (1799).
This is *Agathosma serratifolia* (Curt.) Spreeth
175. *Diosma serruriaefolia* (Eckl. & Zeyh.) D. Dietr., Synops. Plant. **1**: 825 (1839).
This is *Agathosma bifida* (Jacq.) Bartl. & Wendl.
176. *Diosma spartiifolia* Steud. in Flora **13**: 550 (1830).
This is *Agathosma ovata* (Thunb.) Pillans
177. *Diosma speciosa* Sims, Bot. Mag. t. 1271 (1810).
This is *Adenandra villosa* (Berg.) Licht. ex Roem. & Schult.
178. *Diosma speciosa* Hort. Cels. in Steud. Nom. Bot. **1**: 513 (1841).
This is *Agathosma corymbosa* (Mont.) G. Don
179. *Diosma sphaerocephala* Lodd. Bot. Cab. **15**: 1490 (1828).
This is *Agathosma foetidissima* Hortul. ex Steud.
180. *Diosma spicata* (Licht. ex Roem. & Schult.) DC., Prodr. **1**: 715 (1824).
Bucco spicata Licht. ex Roem. & Schult., Syst. Veg. **5**: 448 (1819).
This is *Agathosma spicata* (Licht.) G. Don, an imperfectly known species.
181. *Diosma squalida* E. Mey. in Drège, Zwei. Pfl. Doc.: 179 (1844)—nom. nud.
This is *Raspalia globosa* (Lam.) Pillans
182. *Diosma squamosa* Willd. ex Roem. & Schult., Syst. Veg. **5**: 462 (1819).
This is *Agathosma squamosa* (Willd. ex Roem. & Schult.) Bartl. & Wendl.
183. *Diosma squarrosa* Wendl. ex Bartl. & Wendl., Diosm. in Beitr. Bot. **1**: 198 (1824).
This is *Macrostylis squarrosa* Bartl. & Wendl.
184. *Diosma stadensis* (Eckl. & Zeyh.) D. Dietr., Synops. Plant. **1**: 826 (1839).
This is *Agathosma cerefolium* (Vent.) Bartl. & Wendl.
185. *Diosma stenopetala* Steud. in Flora **13**: 549 (1830).
This is *Agathosma stenopetala* (Steud.) Steud.
186. *Diosma stenophylla* Spreng., Syst. Veg. **1**: 785 (1825).
This is *Agathosma ovata* (Thunb.) Pillans
187. *Diosma stricta* Willd. ex Roem. & Schult., Syst. Veg. **5**: 462 (1819).
This is *Agathosma serpyllacea* (Licht. ex Roem. & Schult.) Bartl. & Wendl.
188. *Diosma suaveolens* (Eckl. & Zeyh.) D. Dietr., Synops. Plant. **1**: [illegible]6 (1839).
This is *Agathosma cerefolium* (Vent.) Bartl. & Wendl.
189. *Diosma tenella* Lodd. Cat. in Bot. Cab. **2**: 14 (1818)—nom. nud.
190. *Diosma tenuiflia* Presl. Bot. Bemerk.: 31 (1844)—nom. nud.
This is *Coleonema calycinum* (Steud.) Williams

191. *Diosma tenuissima* Willd., Enum. Plant. Hort. Berol. Suppl.: 12 (1813)—nom. nud.

This is *Agathosma capensis* (L.) Dümmer

192. *Diosma teretifolia* Hort. Angl. ex Link, Enum. Hort. Berol. **1**: 237 (1821).

This is *Acmadenia teretifolia* (Link) Phillips

193. *Diosma ternata* (Eckl. & Zeyh.) D. Dietr., Synops. Plant. **1**: 829 (1839).
Barosma ternata Eckl. & Zeyh., Enum. Plant.: 103 (1835).

This is *Agathosma ovata* (Thunb.) Pillans

194. *Diosma tetragona*, L.f., Suppl. Plant.: 155 (1781).

This is *Acmadenia tetragona* (L.f.) Bartl. & Wendl.

195. *Diosma thunbergiana* Spreng., Syst. Veg. **1**: 786 (1825).

This is *Agathosma capensis* (L.) Dümmer

196. *Diosma thymifolia* Willd. ex Roem. & Schult., Syst. Veg. **5**: 462 (1819).

This is *Agathosma ciliaris* (L.) Druce

197. *Diosma thyoides* Willd. ex Roem. & Schult., Syst. Veg. **5**: 462 (1819).

This is *Agathosma capensis* (L.) Dümmer

198. *Diosma tomentosa* Lee ex Bartl. & Wendl., Diosm. in Beitr. Bot. **1**: 168 (1824)—nom. nud.

This is *Agathosma ciliaris* (L.) Druce

199. *Diosma trachyphylla* (Eckl. & Zeyh;) D. Dietr., Synops. Plant. **1**: 825 (1839).

This is *Agathosma hispida* (Thunb.) Bartl. & Wendl

200. *Diosma uitenhagensis* D. Dietr., Synops. Plant. **1**: 827 (1839).

This is *Agathosma capensis* (L.) Dümmer

201. *Diosma ulicina* Lodd. Cat. (1824)—nom. nud.

This is apparently *Acmadenia obtusata* (Thunb.) Bartl. & Wendl.

202. *Diosma umbellata* Hort. ex Bartl. & Wendl., Diosm. in Beitr. Bot. **1**: 81 (1824).

This is *Adenandra villosa* (Berg.) Licht. ex Roem. & Schult.

203. *Diosma umbellata* Thunb. in Hoffm. Phytogr. Blaetter. **1**: 24 (1803)

This is *Agathosma bifida* (Jacq.) Bartl. & Wendl.

204. *Diosma undulata* Thunb., Flor. Cap. **2**: 132 (1818) fide Ind. Kew.

This appears to be a typographical error = *D. ustulata*.

205. *Diosma unicapsularis* L. f., Suppl. Plant.: 155 (1781).

This is *Empleurum unicapsulare* (L.f) Skeels

206. *Diosma uniflora* Druce in Rep. Bot. Exch. Cl. Brit. Isles **1913**.3: 417 (1914)—nom. illegit.
Brunia uniflora L. Sp. pl. **1**: 199 (1753).
Diosma cupressina L. Mant.: 50 (1767).

This is possibly *Thamnia uniflora* Soland. ex Brongn.

207. *Diosma uniflora* L. Sp. pl.: 198 (1753).

This is *Adenandra uniflora* (L.) Willd., on the same sheet in LINN are specimens of *A. villosa*.

208. *Diosma ustulata* Thunb. in Hoffm. Phytogr. Blaetter. **1**: 25 (1803).

This most probably is *Thamnea uniflora* Soland. ex Brongn.

209. *Diosma ventenatiana* (Roem. & Schult.) Spreng., Syst. Veg. **1**: 786 (1825).
Bucco ventenatiana Roem. & Schult. **5**: 442 (1819).

This is *Agathosma corymbosa* (Mont.) G. Don

210. *Diosma venusta* (Eckl. & Zeyh.) D. Dietr., Synops. Plant. **1**: 829 (1839).
Barosma venusta Eckl. & Zeyh., Enum. Plant.: 102 (1835).

This is *Agathosma venusta* (Eckl. & Zeyh.) Pillans

211. *Diosma vestita* (Licht. ex Roem. & Schult.) DC., Prodr. **1**: 715 (1824).
Bucco vestita Licht. ex Roem. & Schult., Syst. Veg. **5**: 447 (1819).
This is *Agathosma imbricata* (L.) Willd.

212. *Diosma villosa* Thunb., Prodr. Plant Cap.: 43 (1749).
This is *Macrostylis villosa* (Thunb.) Sonder

213. *Diosma virgata* Hort. ex. Bartl. & Wendl., Diosm. in Beitr. Bot. **1**: 145 (1824)—nom. nud.
This is *Agathosma imbricata* (L.) Willd.

214. *Diosma virgata* Lam., Encycl. Meth. Bot. **2**: 286 (1876).
This is *Agathosma virgata* (Lam.) Bartl. & Wendl.

215. *Diosma virgata* G. F. W. Mey. (not E. Mey.) ex Sond. in Flor. Cap. **1**: 378 (1869).
This is *Coleonema juniperinum* Sonder in Drège's collections.

216. *Diosma viscida* (Eckl. & Zeyh.) D. Dietr., Synops. Plant. **1**: 828 (1839).
This is *Adenandra viscida* Eckl. & Zeyh.

217. *Diosma wendlandiana* DC., Prodr. **1**: 715 (1824).
This is *Agathosma corymbosa* (Mont.) G. Don

218. *Diosma wittebergensis* Compton in Trans. Roy. Soc. S. Afr. **19**: 297 (1931).
This is *Acmadenia wittebergensis* (Compton) Williams

Bibliography of Publications Relating to Studies in the Genera of the *Diosmeae* (Rutaceae).

Aiton, W., 1789. *Hortus Kewensis.* **1**: 274–276, **2**: 340–488. London.

Andrews, H. C., 1807. *The Botanist's Repository* t. 451.

Ballion, H., 1875. *The Natural History of Plants.* **4**: 390. London: L. Reeve & Co.

Bartling, F. G. and Wendland, H. L., 1824. Diosmeae. *Beiträge zur Botanik* **1**: 1–214. Göttingen: Van den Hoek & Ruprecht.

Bartling, F. G., 1843. Descriptiones Diosmearum Capensium. *Linnaea* **17**: 352–382. Halle.

Bentham, G. and Hooker, J. D., 1862–1867. *Genera Plantarum* **1**: 280–291.

Boerhaave, H., 1720. *Index Alter Plantarum . . .* **2**: 238. Leyden.

Bolus, H., 1898. *Phyllosma* in Engler's *Botanische Jahrbücher* **24**: 457. Leipzig.

Burman, N. L., 1768. *Prodromus Florae Capensis.*: 6. Leiden and Amsterdam.

Candolle, P. de, 1824. *Prodromus* **1**: 710–732. Paris.

Chamisso, A. de, 1830. *Rutaceae* in *Linnaea* **5**: 51–56. Berlin.

Chun, C., 1908. *Deutsche Tiefsee-Expedition.*: 143. Jena: Gustav Fischer.

Colla, A., 1833. *Herbarium Pedemontanum* **1**: 550–553. Turin: Typis Regiis.

Commelin, C., 1706. *Horti Medici Amstelaedamensis* 1–3. Leiden: Fredericum Haringh.

Compton, R. H., 1932. Novitates Africanae in *Journ. Bot.* **70**: 284–286.

Dietrich, D. N. F., 1839. *Synopsis Plantarum* **1**: 824–829. Vimariae.

Don, G., 1831. *A General System of Gardening and Botany* **1**: 782–790. London.

Drège, J. F., 1844. *Zwei Pflanzengeographische Documente.* Leipzig.

Drège, J. F., 1847. Zeyher's Localities in South Africa. *Linnaea* **19**: [illegible]–599. Halle.

Druce, G. C., 1914. in *Rep. botl Exch. Club Br. Isl.*, **1913**. 3: 417.

Dümmer, R. A., 1912. in *Fedde's Repertorium . . .*: 120–121,: 163–164,: 321–337,: 401–423. Berlin.

DÜMMER, R. A., 1912. in *Kew Bulletin*: 90–92.

DÜMMER, R. A., 1913. in *Journal of Botany* **51**: 221. London.

DÜMMER, R. A., 1920–1921. in *The Annals of the Bolus Herbarium* **3**: 1, :67–123.

ECKLON, C. F. and ZEYHER, C., 1835. *Enumeratio Plantarum Africae Australis Extratropicae . . .*: 99–117. Hamburg.

ENDLICHER, S., 1840. *Genera Plantarum Secundum . . .*: 1156–1159.

ENGLER, H. G. A., 1931. *Die Natürlichen Pflanzenfamilien* **19a**: 266–278. Leipzig: Wilhelm Engelman.

ESTERHUYSEN, E., 1943. in *Journal of South African Botany* **9**: 137.

ESTERHUYSEN, E., 1950. in Adamson and Salter, *Flora of the Cape Peninsula*: 536–538. Cape Town: Juta & Co.

FABRICI, P. C., 1759. *Enumeratio Methodica Plantarum Horti Medici Helmstadiensis.*: 145. Helmstadii: Joannis Drimbornii.

FISCHER, F. E. L., 1808. *Catalogue du Jardin des Plantes . . . à Gorenski.*: 94. Moscow.

GAERTNER, J., 1791. *De Fructibus et Seminibus Plantarum.*: 82. t. 94. Tübingen: Guiliemi Henrici Schrammii.

GLOVER, R., 1915. in *The Annals of the Bolus Herbarium* **1**: 87–142.

GLOVER, R., 1918. in *The Annals of the Bolus Herbarium* **2**: 153.

HOFFMANN, G. F., 1803. *Phytographische Blaetter.* **1**: 24–25. Göttingen.

HOFFMANNSEGG, 1826. *Verzeichniss der Pflanzenkulturen*: 106. Dresden.

HOOKER, W. J., 1834. in *Curtis's Botanical Magazine* **61**: 3340. London.

HOUTTUYN, F., 1775. *Natuurlyke Historie . . .***2**.4: 319–328. Amsterdam.

INDEX KEWENSIS

INDEX LONDONENSIS 1921–1931

JACQUIN, N. J., 1789. *Collecteana* **3**: 278–279. Vienna: Officiana. Wappleriana.

JUEL, H. O., 1918. *Plantae Thunbergianae*: 282–286. Uppsala: A.B. Akademiska Bokhandel.

JUSSIEU, A. DE, 1789. *Genera Plantarum*: 198. Paris. Herissant.

JUSSIEU, A. DE, 1825. Memoir sur le Groupe de Rutacée in *Memoires du Museum d'Histoire Naturelle* **13**: 469–477, :529–531. Paris.

KER, J. B., 1821. in Edwards' *Botanical Register* **7**: 563. London. James Ridgway.

KRAUSS, F., 1846. in *Flora*: 38–40. Regensburg.

LAMARCK, LE CHEVALIER DE, 1786. *Encyclopedie Méthodique Botanique* **2**: 283–289. Paris: Panckoucke.

LAMARCK, LE CHEVALIER DE, 1812. *Encyclopedie Methodique Botanique* Supplément, **2**: 484. Paris: H. Agasse.

LAMARCK, LE CHEVALIER DE, 1823. *Reçueil des Planches* **1**: pl.127. Paris.

LINDMAN, C. A. M., 1909. A Linnean Herbarium in the Natural History Museum in Stockholm in *Arkiv för Botanik* **9.** 6: 26–27. Uppsala & Stockholm: Almqvist & Wiksells.

LINK, H. F., 1821. *Enumeratio Plantarum* **1**: 237–239. Berlin: G. Reimer.

LINNAEUS, C., 1737. *Genera Plantarum*: 60. Leiden: Conradum Wishoff.

LINNAEUS, C., 1737. *Hortus Cliffortianus*: 71–72. Amsterdam.

LINNAEUS, C., 1737. *Viridarium Cliffortianum*: 19. Amsterdam.

Linnaeus, C., 1743. *Genera Plantarum* ed. 2: 72–73, 107. Paris: Michaelis Antonii David.

Linnaeus, C., 1754. *Genera Plantarum* ed. 5: 92, 134. Stockholm: Laurentii Salvii.

Linnaeus, C., 1764. *Genera Plantarum* ed. 6: 60. Stockholm: Laurentii Salvii.

Linnaeus, C., 1753. *Species Plantarum* **1**: 198–199, 274. Stockholm: Laurentii Salvii.

Linnaeus, C., 1764. *Species Plantarum* ed. 3. **1**: 286–289, 373. Vindobonae: Joannis Thamae de Trattner.

Linnaeus, C., 1767. *Mantissa Plantarum* **1**: 50. Holmae.

Linnaeus, C., 1771. *Mantissa Plantarum* **2**: 210, :342–343, :359. Stockholm: Laurentii Salvii.

Linnaeus, C. fil., 1781. *Supplementum Plantarum*: 154–155. Brunswig: Impensis Orphanotrophei.

Loddiges, C. & Sons, 1819. *The Botanical Cabinet*: 303. London: John & Arthur Arch etc.

Loddiges, C. & Sons, 1826. *The Botanical Cabinet*: 1498. London: John & Arthur Arch etc.

Martius, C. F. P. von, 1814, *Dissertatio inauguralis Sistems Plantarum Horti Academici Erlangenris . . .*: 67. Erlangae.

Miller, P., 1733. *The Gardener's Dictionary . . . ed.* **2**. *Spiraea . . .* London.

Miller, P., 1760. *Figures of Plants* **1**: 83–84, pl. 124. London: John Rivington.

Moench, C., 1802. *Methodus Plantus Horti Botanici et Agri Marburgensis* – Supplementum: 26. Marburgi Cattorum.

Oliver, D., 1885. in *Hooker's Icones Plantarum* pl. 1476. London: Williams and Norgate.

Persoon, C. H., 1805–1807. *Synopsis Plantarum* **1**: 246–247. Paris: Cramer.

Phillips, E. P., 1917. in *Annals of the South African Museum* **9**: 339–341. London: Adland and Son and West Newman Ltd.

Phillips, E. P., 1920. in *Kew Bulletin*: 23. London.

Phillips, E. P., 1930. in the *South African Journal of Science* **27**: 39–80. Johannesburg:

Phillips, E. P., 1943. in *Journal of South African Botany* **9**: 137.

Pillans, N. S., 1950. A revision of *Agathosma*. in *Journal of South African Botany* **16**: 55–183.

Plukenet, L., 1691. *Phytographia* t. 279. London.

Plukenet, L., 1696. *Almagestum Botanicum*: 50, 68, 136, t. 347. London:

Plukenet, L., 1700. *Almagesti Botanici Mantissa*: 49, t, 342. London:

Plukenet, L., 1705. *Amaltheum Botanicum*: 84, t. 411. London:

Presl, K. B., 1844. *Botanische Bemerkungen*: 30–32. Prague: Gottlieb Haase Söhne.

Ray, J., 1704. *Historiae Plantarum*. **3** *Supplementum*: 91. London: Sam Smith & Benj. Walford.

Rees, A., 1819. *Cyclopaedia* **11**: *Diosma*. London. Longman, Hurst, Rees, Orme and Brown.

Richter, H. E., 1840. *Caroli Linnaei Systema, Genera, Species Plantarum*: 215–216. Leipzig: Otto Wigand.

Roemer, J. J. and Schultes, J. A., 1819. *Systema Vegetabilium*: 438–463. Stuttgart: J. G. Cottae.

Royen, A. van, 1740. *Florae Leydensis Prodromus . . .*: 435. Leiden.

SALISBURY, R. A., 1796. *Prodromus Stirpum in horto ad Chapel Allerton*: 142–143. London

SAVAGE, S., 1945. *A Catalogue of the Linnaean Herbarium*: 41. London: Taylor & Francis Ltd.

SCHINZ, H., 1900. in *Mémoires de L'Herbier Bossier* **12**: 19. Genève & Basle: Georg & Co.

SCHLECHTER, R., 1898. in *Journal of Botany* **36:** 315. London. West, Newman & Co.

SCHLECHTER, R., 1898. in *Engler's Botanische Jahrbücher* . . . **24**: 438–440. Leipzig: Wilhelm Engelman.

SCHLECHTER, R., 1899. in *Engler's Botanische Jahrbücher* . . . **27**: 159–164. Leipzig: Wilhelm Engelmann.

SCHLECHTENDAL, D. F. L., 1831. in *Linnaea* **6**: 196–207. Berlin: Kosten des Herausgebers.

SCHMIDT, F. W., 1793. *Botanische Beobachtungen*: 36–38. Prague: J. G. Calve.

SCHONLAND, S., 1910. in *Transactions of the Royal Society of South Africa.* **1**: 445.

SCHRADER, H. A. and WENDLAND, I. C., 1796. *Sertum Hannoveranum.* Goettingae: Van den hoeck et Ruprecht.

SEBA, A., 1735. *Thesaurus* . . . **2**: tab. 8, 17, 19, 40 & 86. Amsterdam: Wetstenium, Smith & Jansonio-Waesbergios.

SIMS, J., 1822. in *Curtis's Botanical Magazine*: 2332. London: Sherwood, Neely, & Jones.

SKEELS, 1911. in *United States Department Agriculture Bureau Plant Industry, Bulletin* **207**: 54. Washington: Govt. Print. Off.

SONDER, O., 1860. Rutaceae in *Flora Capensis* **1**: 370–442. Dublin: Hodges, Smith & Co.

SPRENGEL, K. P. J., 1813. *Plantarum minus cognitarum, pugillus primus.*: **2**. Halle.

SPRENGEL, C., 1825. *Caroli Linnaei Systema Vegetabilium* ed. 16. **1**: 782–788. Göttingen: Librariae Dieterichianae.

STEUDEL, E. G., 1830. in *Flora* **13**: 537–555.

STEUDEL, E. G., 1841. *Nomenclator Botanicus.*

STRID, A. K., 1972. Revision of the genus *Adenandra* (Rutaceae). in *Op. bot. Soc. bot. Lund.* **32**: 1–112.

THUNBERG, C. P., 1794. *Prodromus Plantarum Capensium:* 42–43: 84. Uppsala: Joh. Edman.

THUNBERG, C. P., 1797. *Dissertatio de Diosma*: 370–390. Upsaliae: Edman.

THUNBERG, C. P., 1818. *Flora Capensis* **2**: 125–147. Copenhagen: Gerhardum Bonnierum.

THUNBERG, C. P., 1803. in Hoffmann, G. F., 1803. *Phytographische Blaetter* **1**: 24, 25. Göttingen:

THUNBERG, C. P., 1823. *Flora Capensis* ed. Schultes: 221–230 Stuttgart: J. G. Cottae.

TURCZANINOW, N., 1858. in *Bulletin de la Société Impériale Naturalistes Moscou* **31**: 1. 438–440.

WACHENDORFF, E. J. VAN, 1747. *Horti Ultrajectini Index*: 47. Utrecht: Nicolaum van Vucht.

WENDLAND, J. C., 1805–1810. *Collectio Plantarum* **1**: 2, t. 1, :31, t. 8, :61, t. 19, :77, t. 27. **2**: 59, t. 61. Hannover:

WILLDENOW, C. L., 1798. *Carl Linnaeus, Species Plantarum* **1**: 2: 1133–1140. Berlin: G. C. Nauk.

WILLDENOW, C. L., 1809. *Enumeratio Plantarum Horti Regii Botanici Berolinensis:* 256–259. Berlin.

WILLDENOW, C. L., *Enumeratio Plantarum Horti Regii Botanici Berolinensis Supplementum:* **12**. Berlin.

WILLIAMS, I. J. M., 1972. A Revision of the Genus *Leucadendron* (Proteaceae): *Contributions from the Bolus Herbarium* **3.**

WILLIAMS, I. J. M., 1973. Studies in the Genera of the *Diosmeae* (Rutaceae): 1. *Jl S. Afr. Bot.* **39**: 179–183.

WILLIAMS, I. J. M., 1973. Studies in the Genera of the *Diosmeae* (Rutaceae): 2. *Jl S. Afr. Bot.:* **39**: 229–232.

WILLIAMS, I. J. M., 1974. Studies in the Genera of the *Diosmeae* (Rutaceae): 3. *Jl S. Afr. Bot.* **40**: 85–89

WILLIAMS, I. J. M., 1974. Studies in the Genera of the *Diosmeae* (Rutaceae): 4. *Jl S. Afr. Bot.* **40**: 275–290.

WILLIAMS, I. J. M., 1975. Studies in the Genera of the *Diosmeae* (Rutaceae): 5. *Jl S. Afr. Bot.* **41**: 167–186.

WILLIAMS, I. J. M., 1975. Studies in the Genera of the *Diosmeae* (Rutaceae): 6. *Jl S. Afr. Bot.* **41**: 239–268.

WILLIAMS, I. J. M., 1978. Studies in the Genera of the *Diosmeae* (Rutaceae): 7. *Jl S. Afr. Bot.* **44**: 329–362.

WILLIAMS, I. J. M., 1979. Studies in the Genera of the *Diosmeae* (Rutaceae): 8. *Jl S. Afr. Bot.* **45**: 147–184.

WILLIAMS, I. J. M., 1981. Studies in the Genera of the *Diosmeae* (Rutaceae): 9. *Jl S. Afr. Bot.* **47**: 63–102. *(Coleonema).*

WILLIAMS, I. J. M., 1981. Studies in the Genera of the *Diosmeae* (Rutaceae): 10. *Jl S. Afr. Bot.* **47**: 157–193. *(Euchaetis).*

WILLIAMS, I. J. M., 1981. Studies in the Genera of the *Diosmeae* (Rutaceae): 11. *Jl S. Afr. Bot.* **47**: 373–403. *(Macrostylis).*

WILLIAMS, I. J. M., 1981. Studies in the Genera of the *Diosmeae* (Rutaceae): 12. *Jl S. Afr. Bot.* **47**: 755–764. *(Phyllosma, Sheilanthera).*

WILLIAMS, I. J. M., 1982. Studies in the Genera of the *Diosmeae* (Rutaceae): 13. *Jl S. Afr. Bot.* **48**: 169–240. *(Acmadenia).*